US010074917B1

(12) **United States Patent**
Ono et al.

(10) **Patent No.: US 10,074,917 B1**
(45) **Date of Patent: Sep. 11, 2018**

(54) **TERMINAL BLOCK**

(71) Applicant: **OMRON Corporation**, Kyoto (JP)

(72) Inventors: **Masahiro Ono**, Okayama (JP); **Taijiro Fujiwara**, Okayama (JP); **Kazuaki Morita**, Izumo (JP); **Hiroyasu Komeyama**, Okayama (JP)

(73) Assignee: **OMRON Corporation**, Kyoto (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/815,712**

(22) Filed: **Nov. 17, 2017**

(30) **Foreign Application Priority Data**

Feb. 28, 2017 (JP) 2017-037548
Apr. 27, 2017 (JP) 2017-088768

(51) **Int. Cl.**
H01R 4/24 (2018.01)
H01R 12/51 (2011.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H01R 12/515*** (2013.01); ***H01R 4/363*** (2013.01); ***H01R 4/4809*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC H01R 4/363; H01R 4/52; H01R 4/4809; H01R 9/2416; H01R 9/2425; H01R 9/2683; H01R 11/07; H01R 12/515
(Continued)

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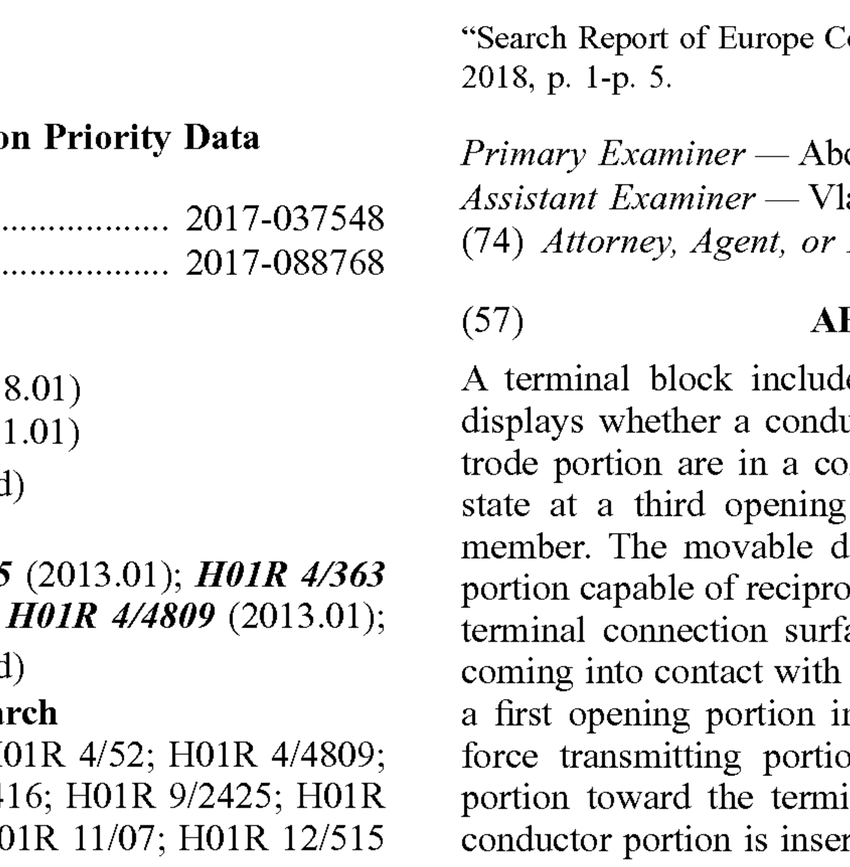
Primary Examiner — Abdullah Riyami
Assistant Examiner — Vladimir Imas
(74) *Attorney, Agent, or Firm* — JCIPRNET

(57) **ABSTRACT**

A terminal block includes a state display portion which displays whether a conductor portion and a terminal electrode portion are in a connected state or a non-connected state at a third opening portion and a movable display member. The movable display member has a main body portion capable of reciprocating in a direction intersecting a terminal connection surface, a contact portion capable of coming into contact with a conductor portion inserted from a first opening portion into an accommodating portion, a force transmitting portion which moves the main body portion toward the terminal connection surface when the conductor portion is inserted from the first opening portion
(Continued)



to the accommodating portion, and rotating mechanism portions which rotate the state display portion so that display of the state display portion can be changed between a connected state and a non-connected state in accordance with the reciprocating movement of the main body portion.

8 Claims, 23 Drawing Sheets

(51) **Int. Cl.**

H01R 9/26	(2006.01)
H01R 4/36	(2006.01)
H01R 11/07	(2006.01)
H01R 9/24	(2006.01)
H01R 13/58	(2006.01)
H01R 12/70	(2011.01)
H01R 4/48	(2006.01)
H01R 4/52	(2006.01)

(52) **U.S. Cl.**
CPC ***H01R 9/2416*** (2013.01); ***H01R 9/2425*** (2013.01); ***H01R 9/2683*** (2013.01); ***H01R 11/07*** (2013.01); ***H01R 12/7064*** (2013.01); ***H01R 13/582*** (2013.01); *H01R 4/52* (2013.01)

(58) **Field of Classification Search**
USPC 439/441, 439, 676
See application file for complete search history.

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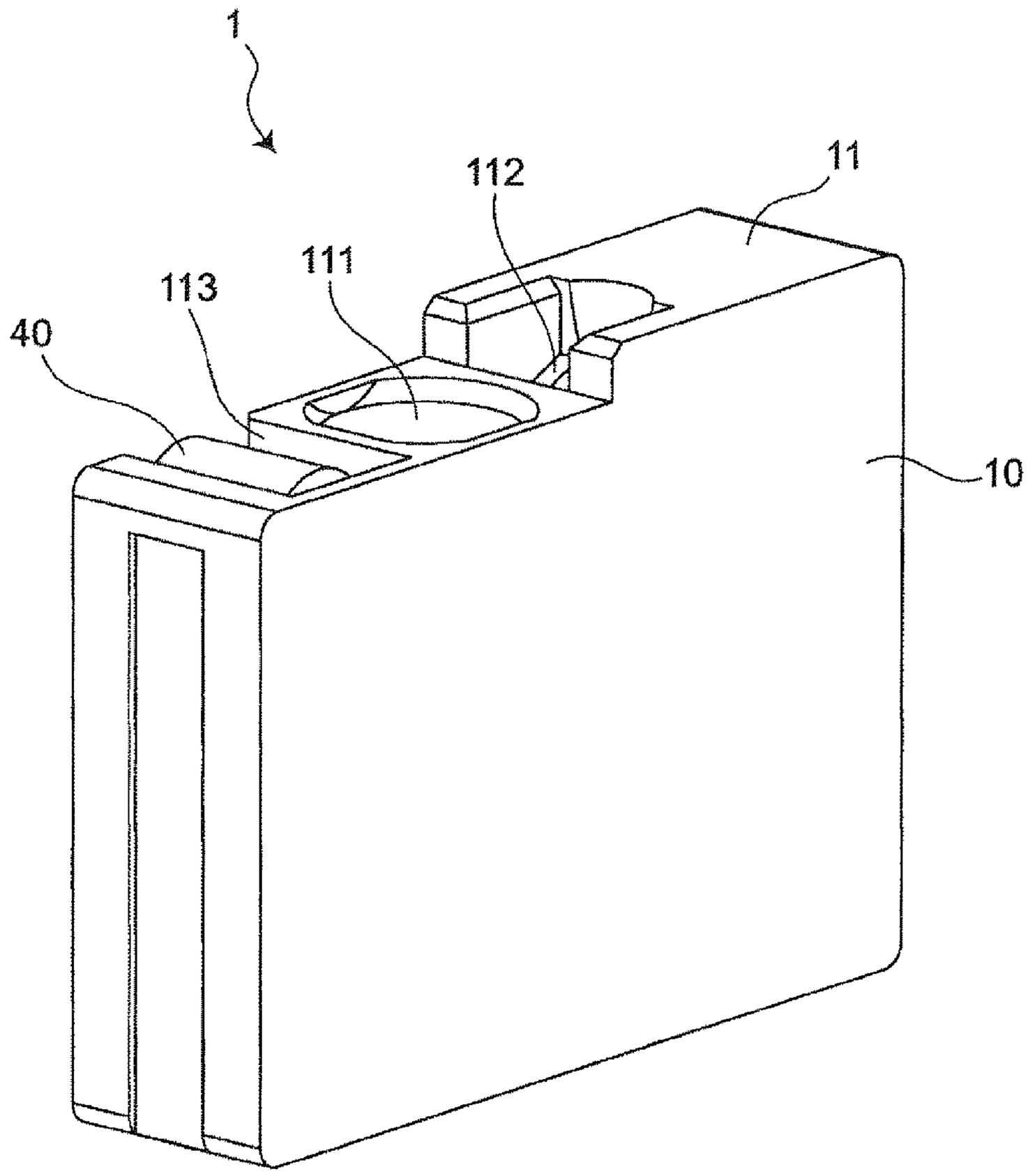

FIG. 1

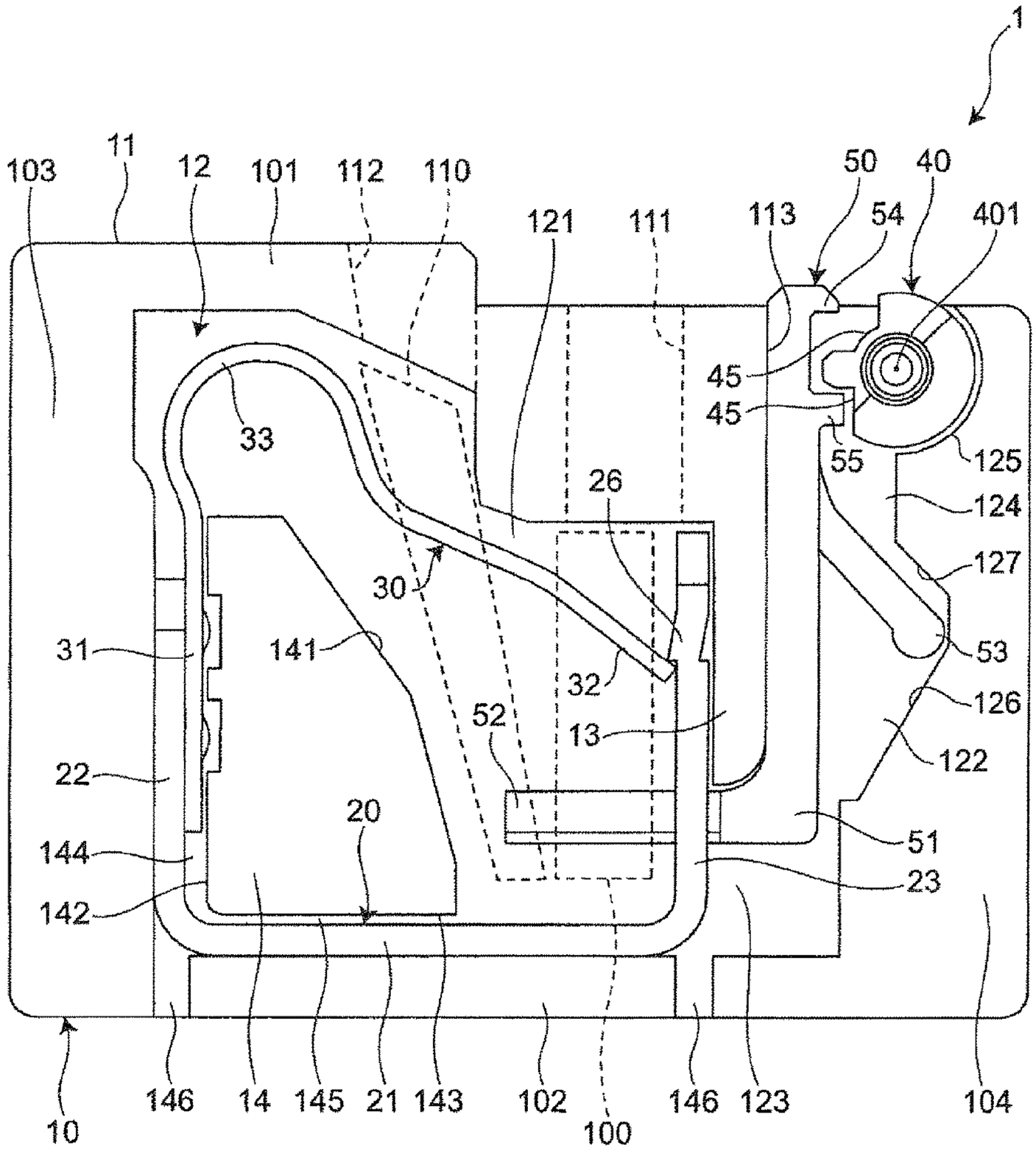
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FIG. 2

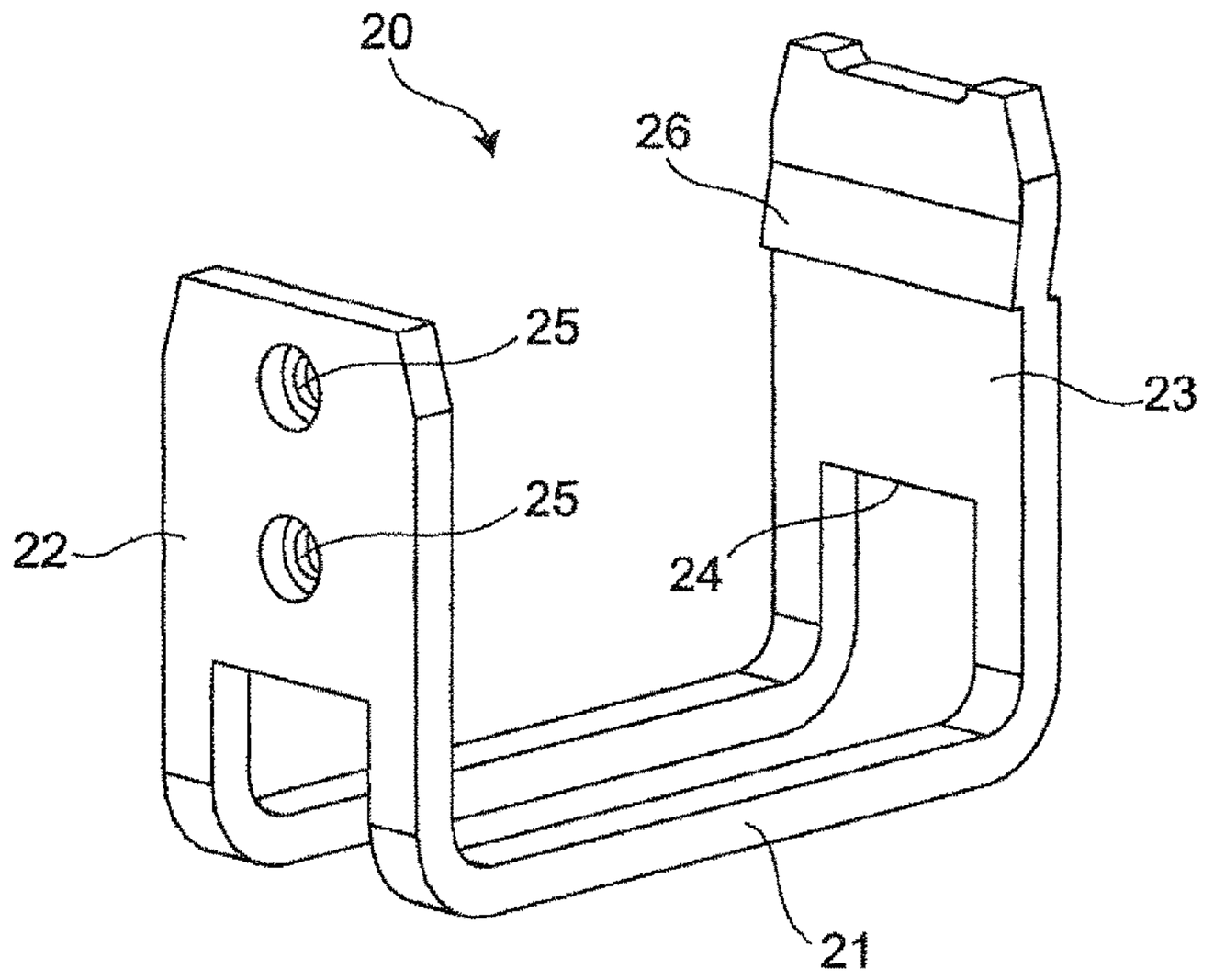

FIG. 3

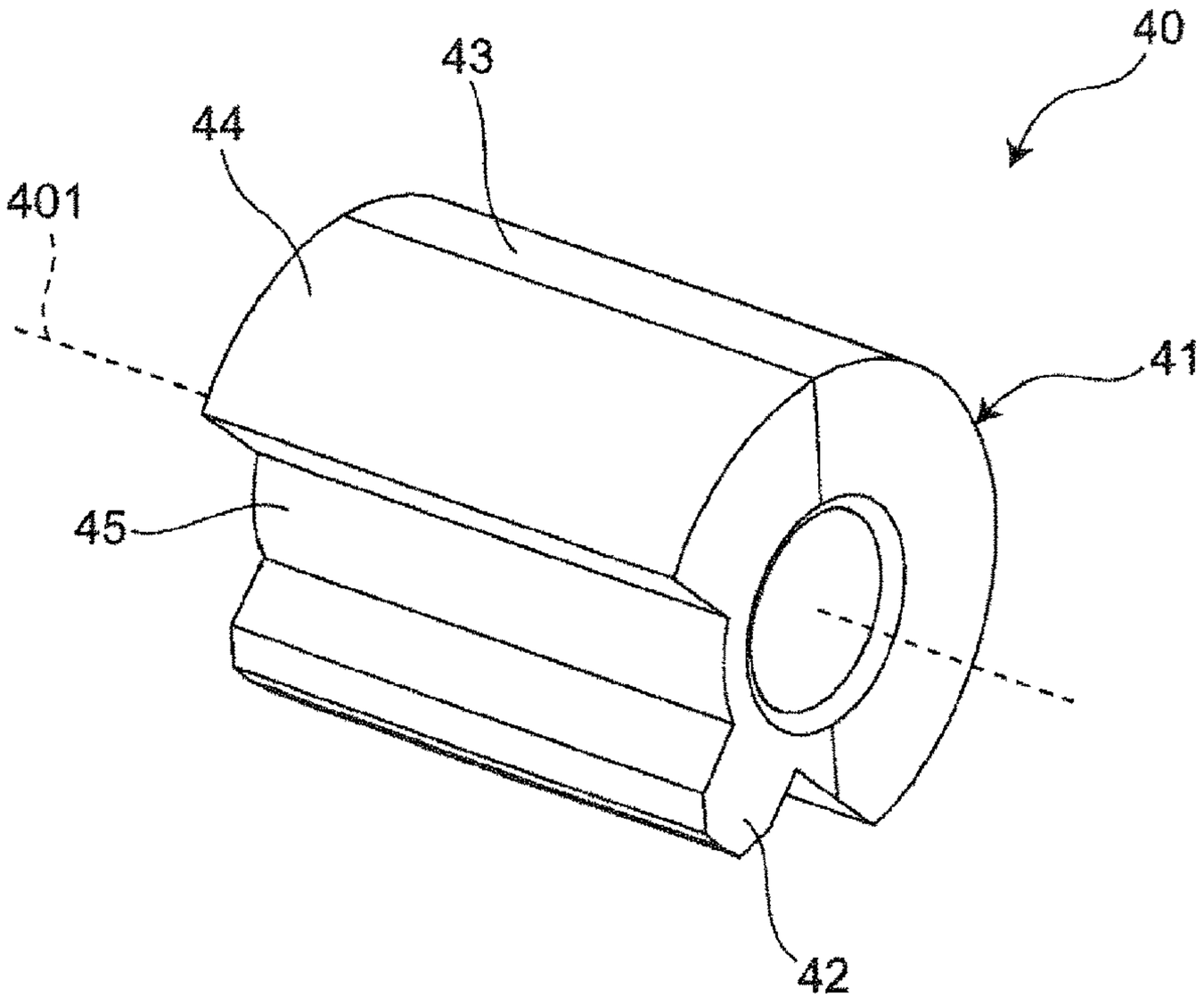

FIG. 4

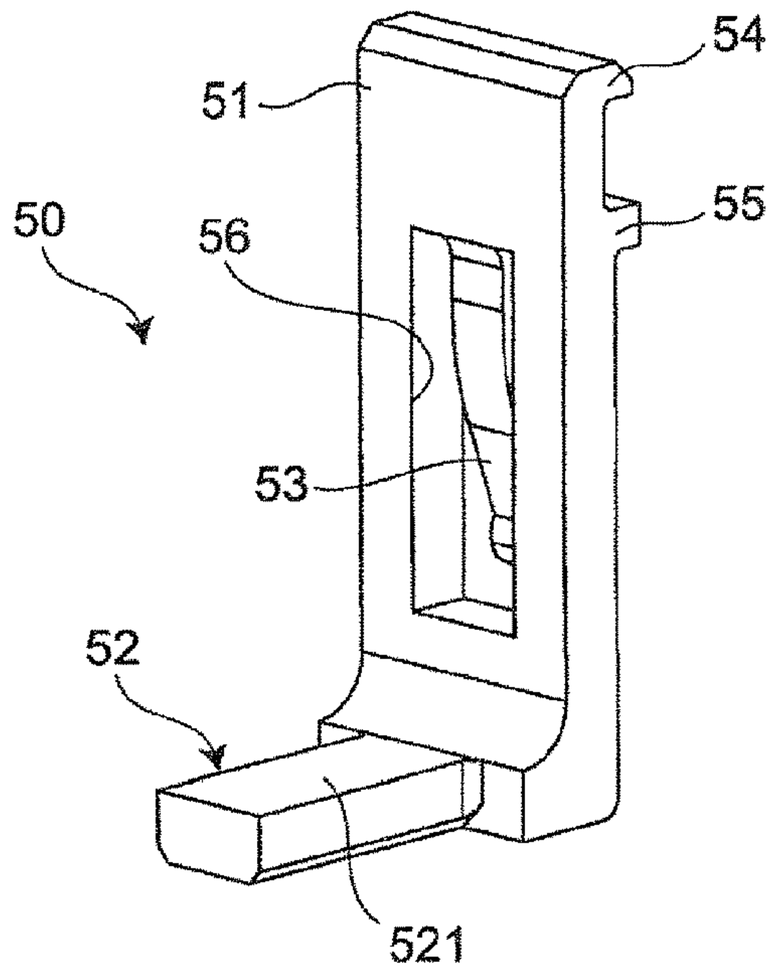
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FIG. 5

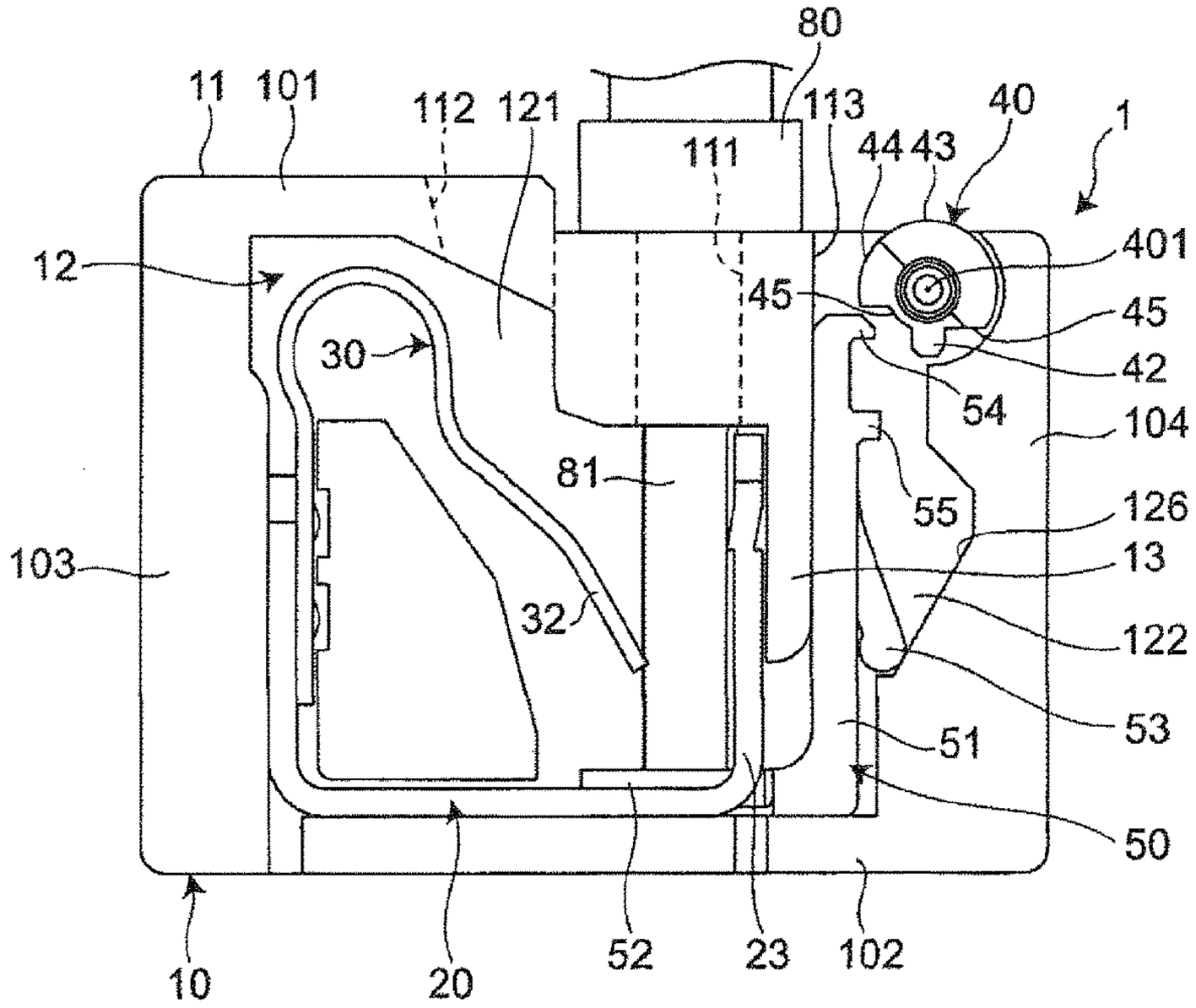
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FIG. 6

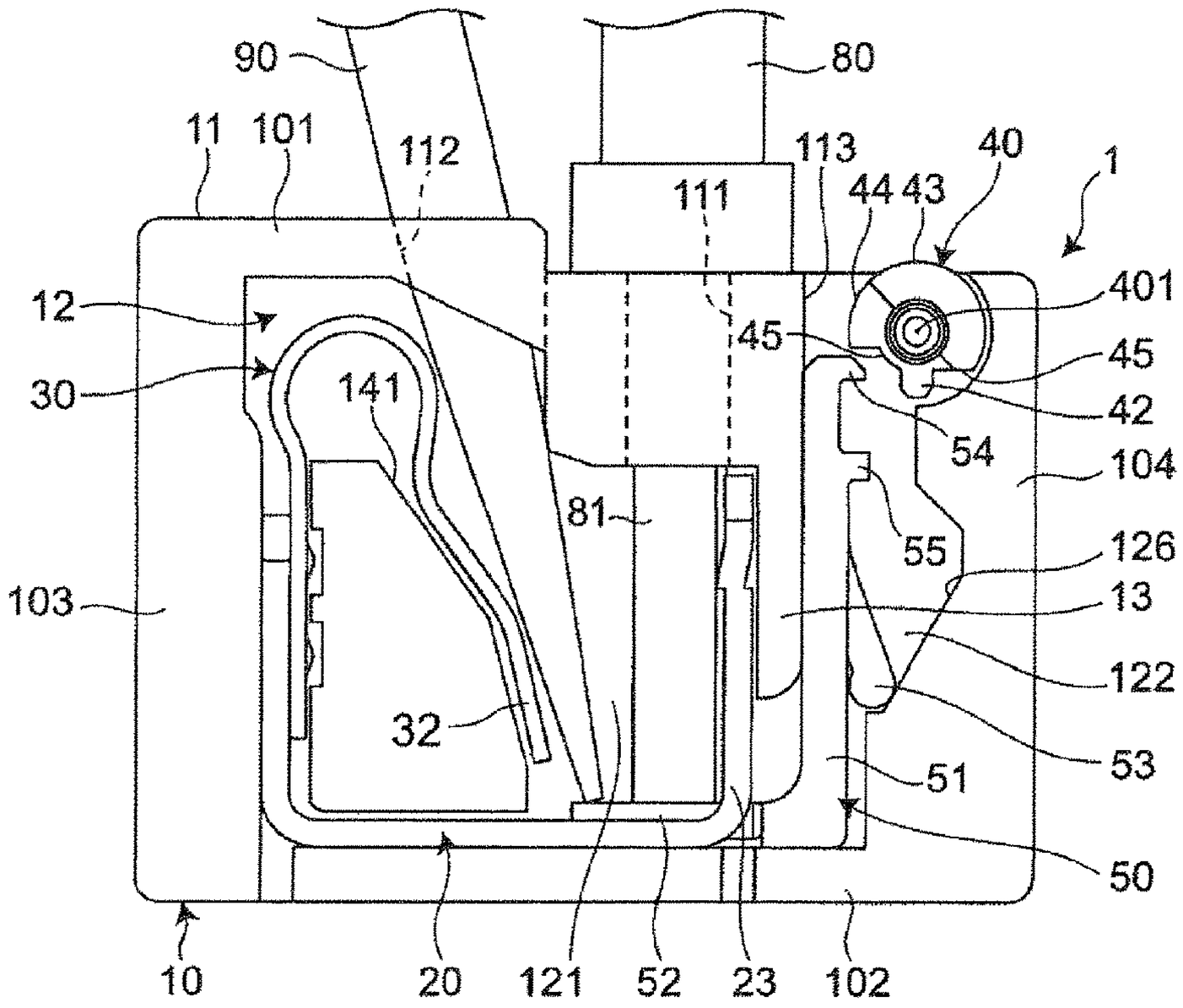
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FIG. 7

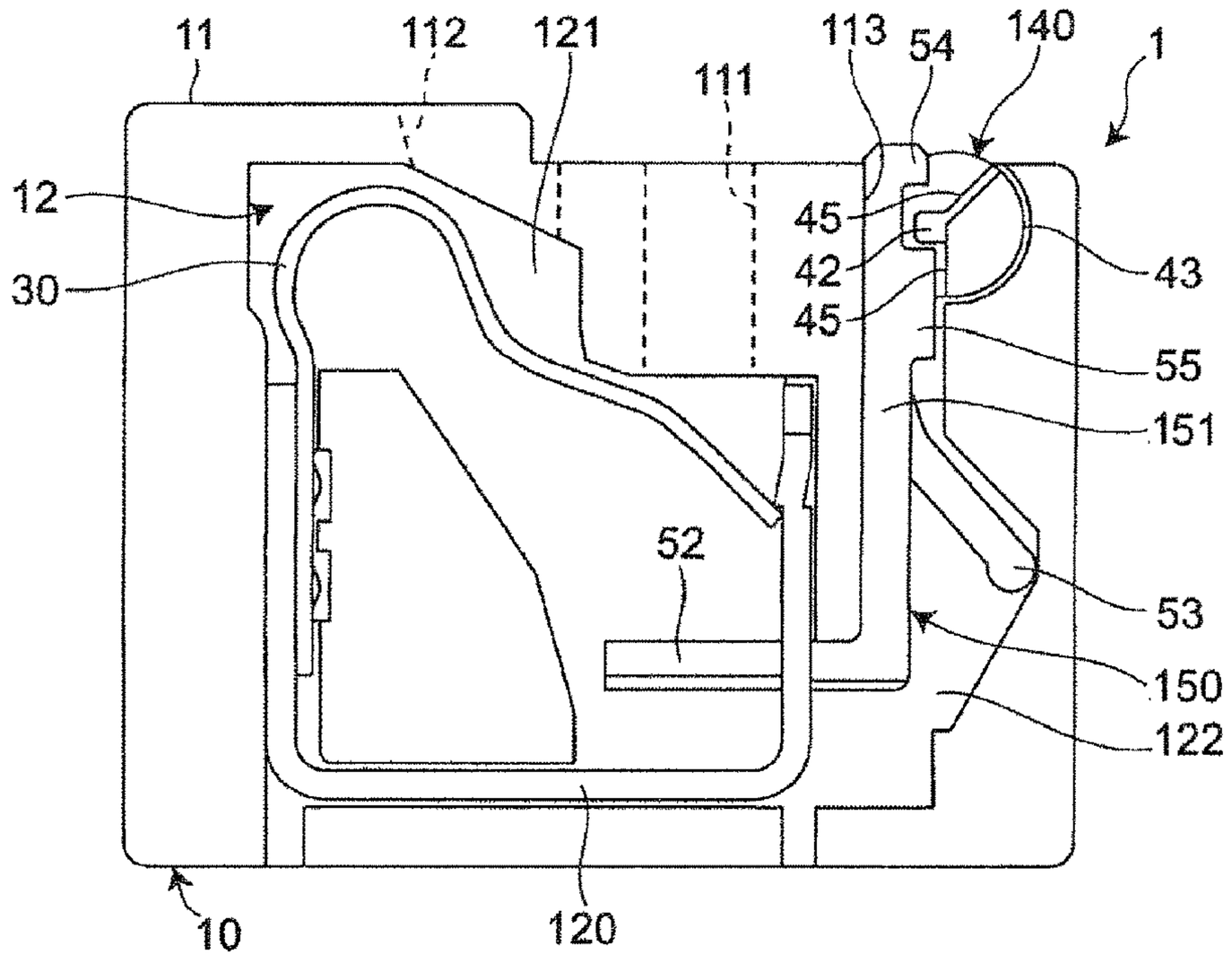
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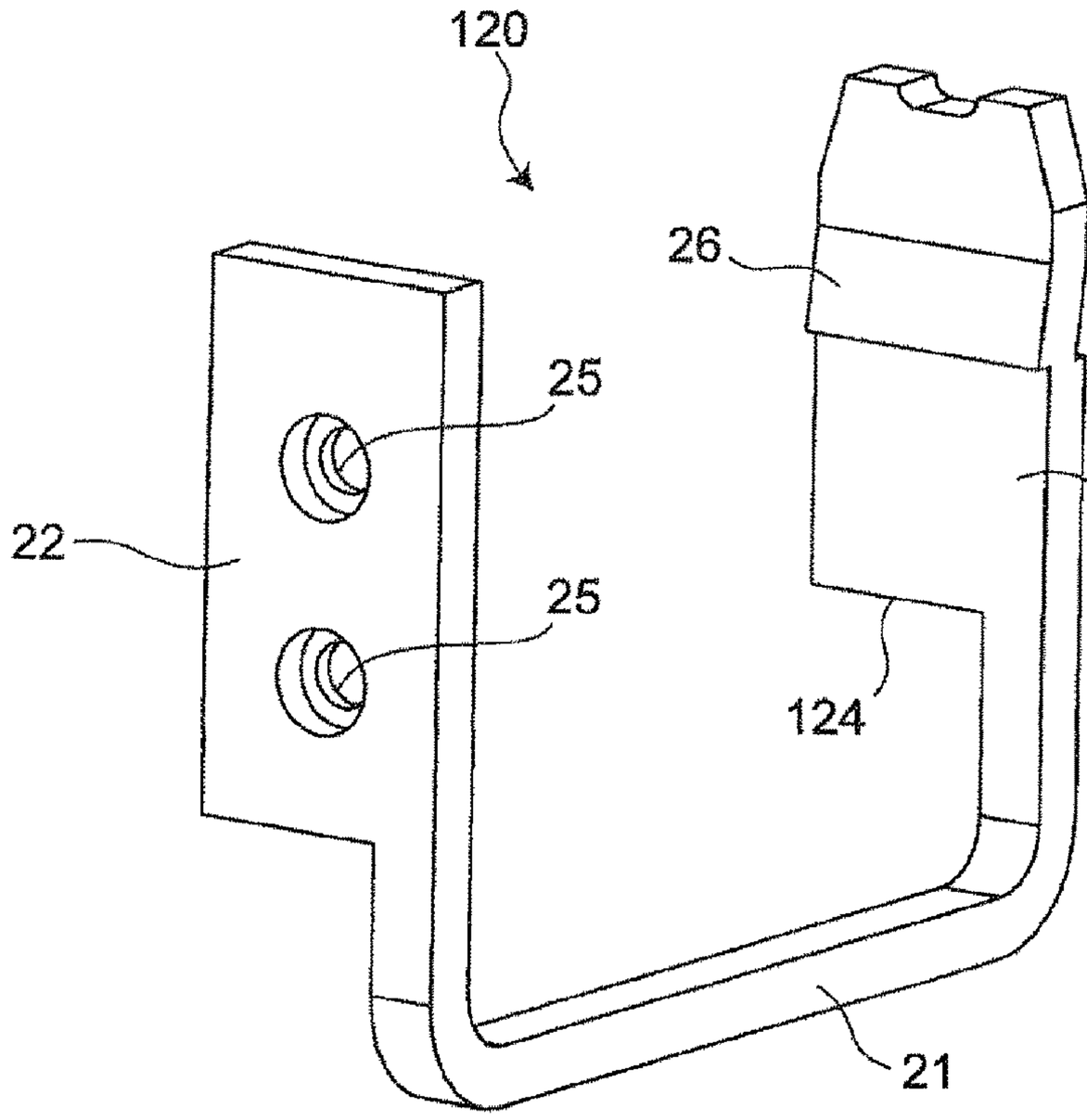
FIG. 8



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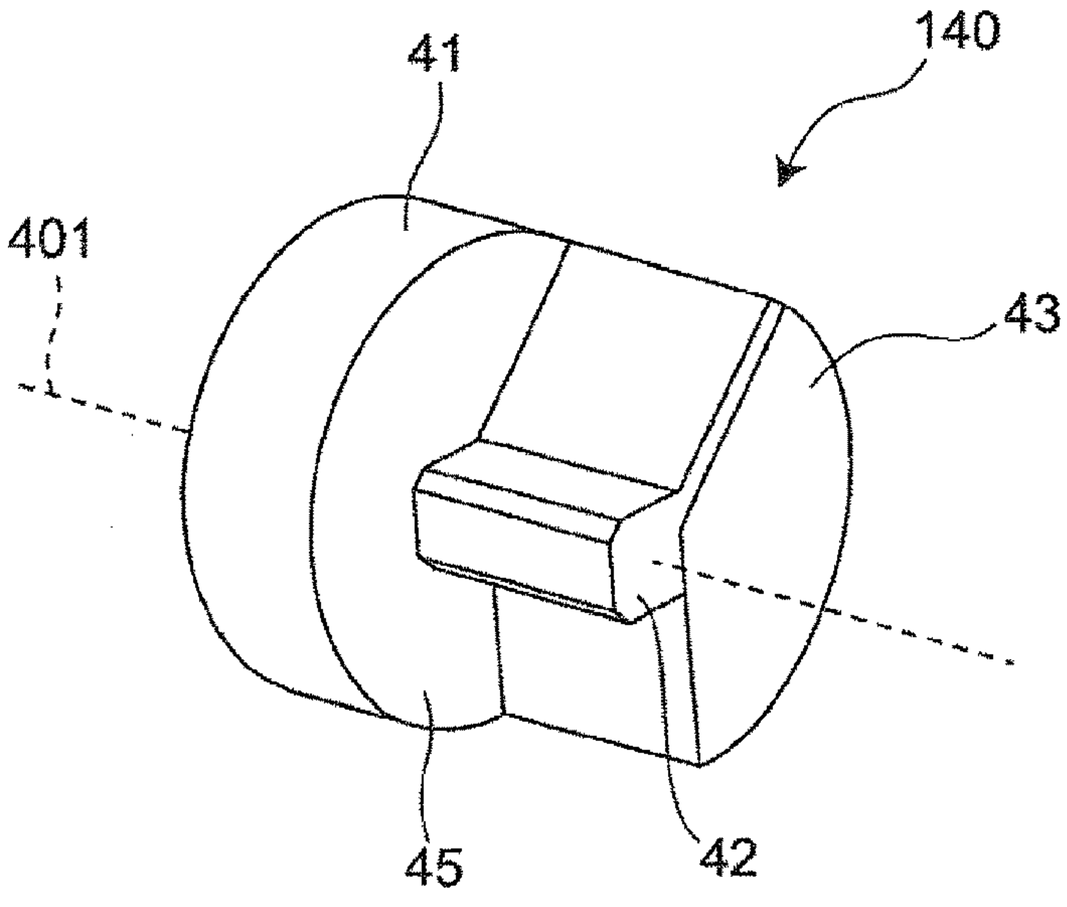

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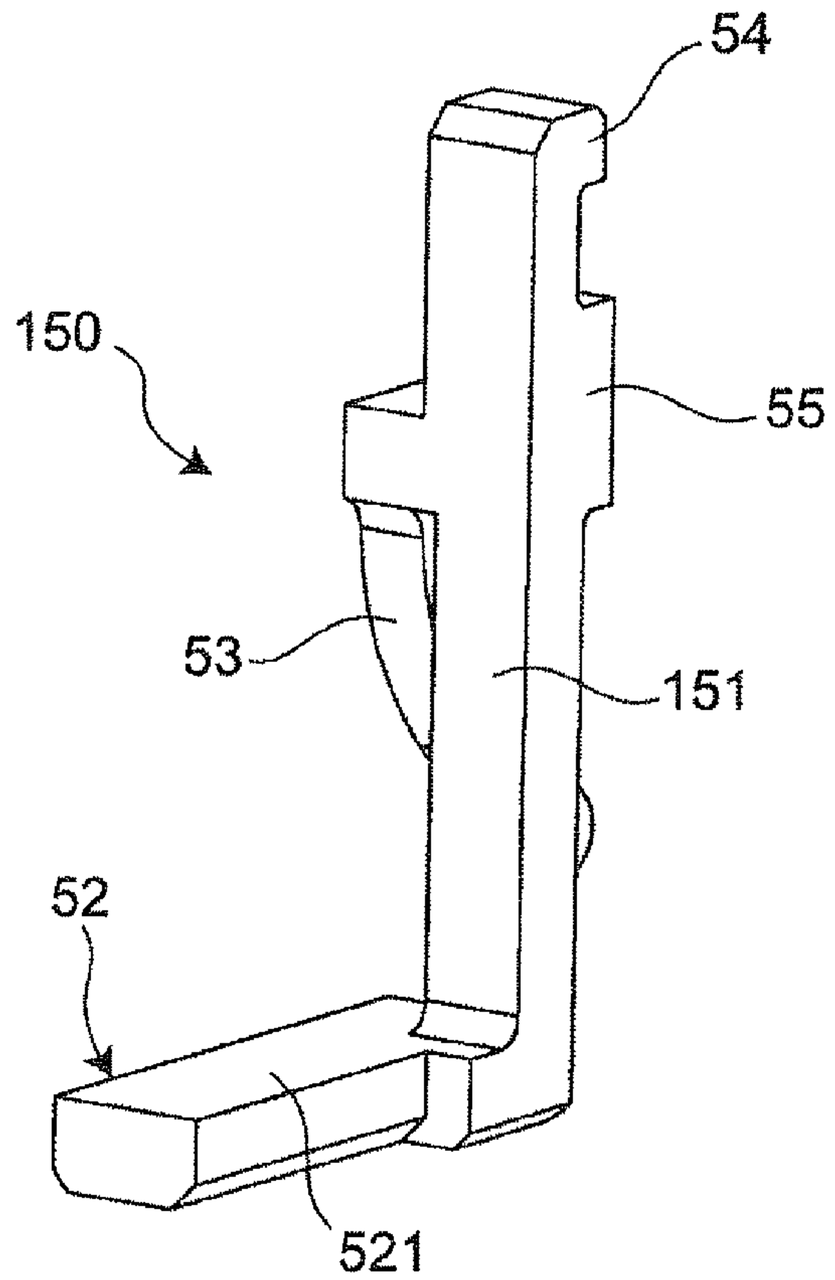

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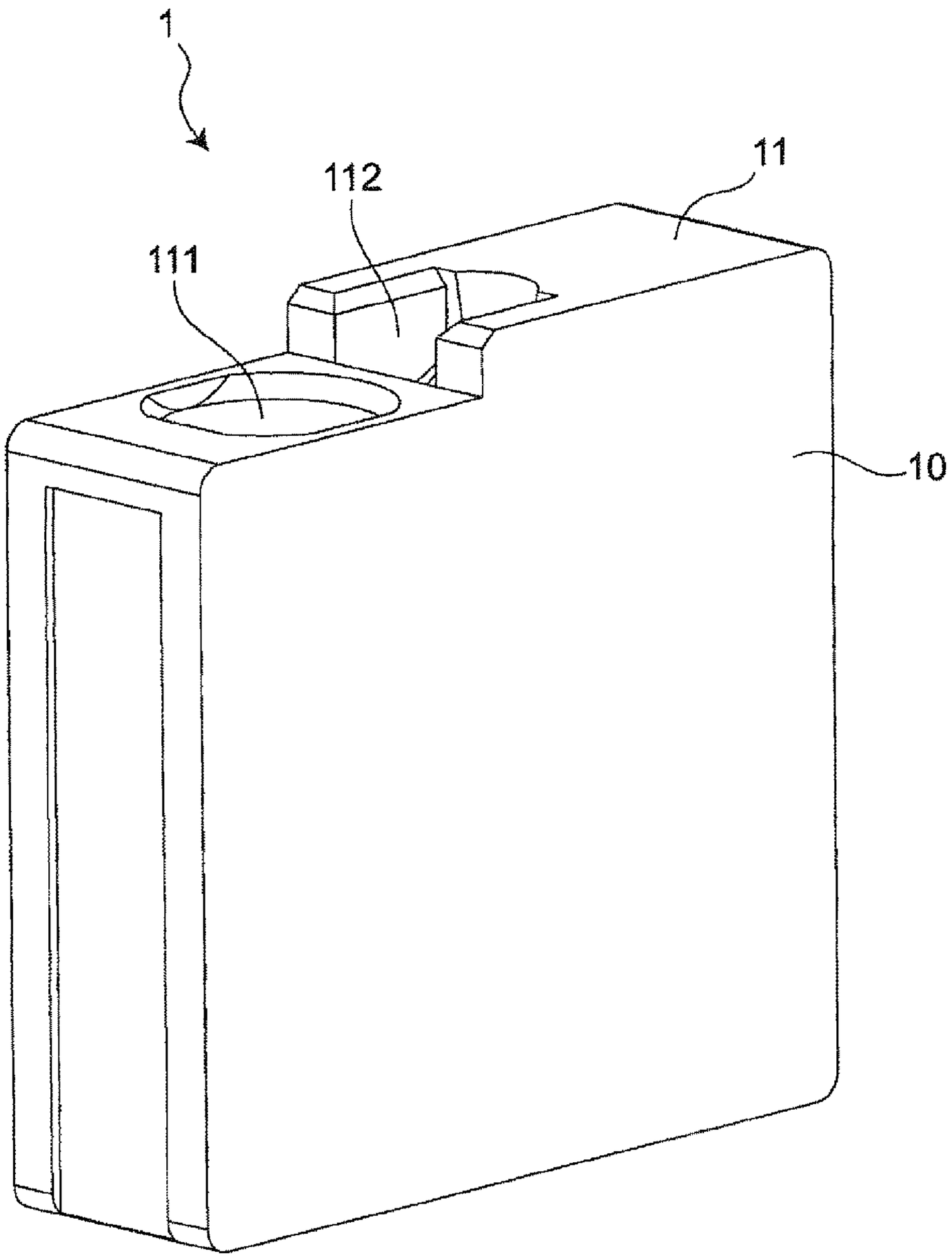

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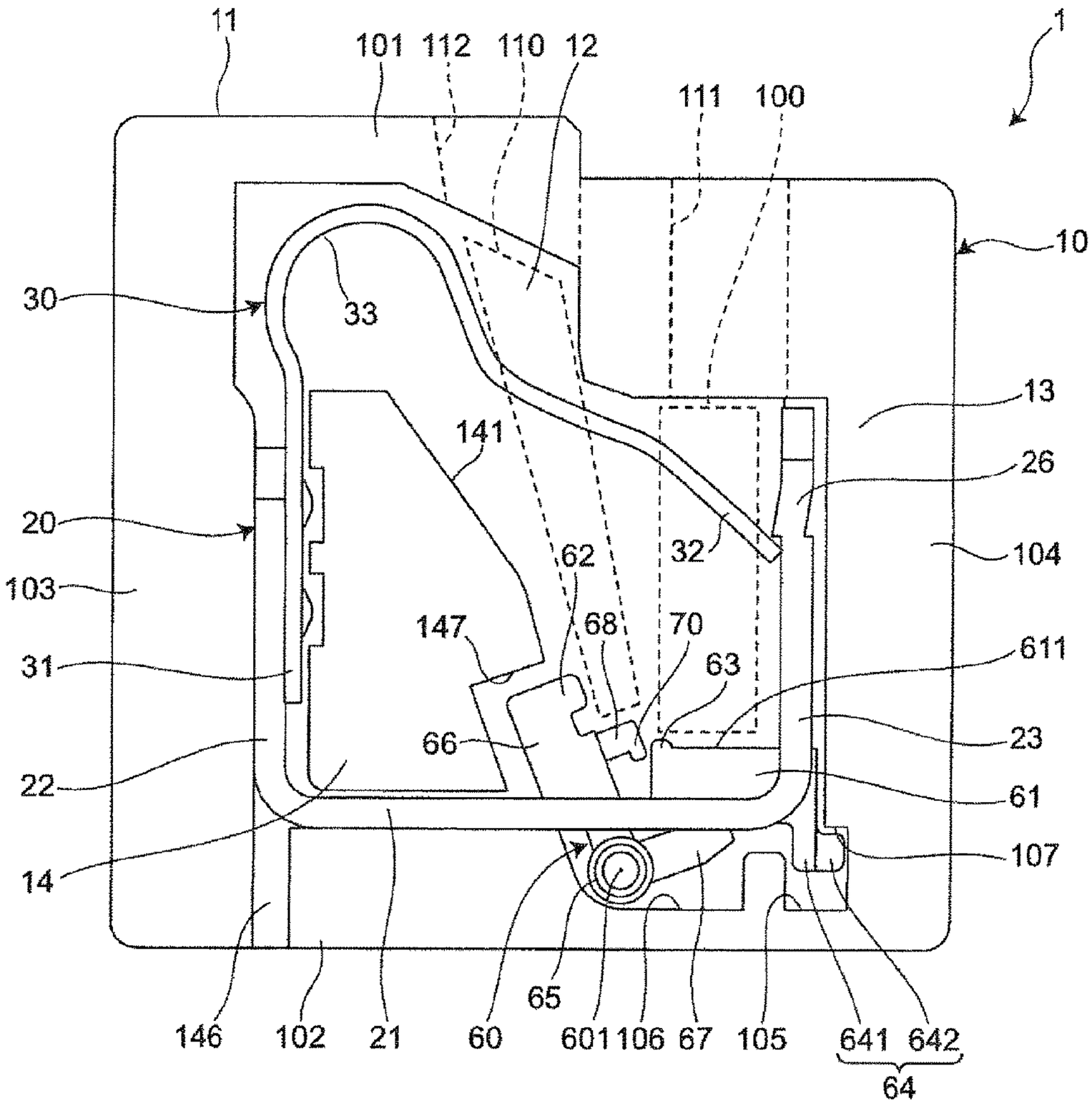
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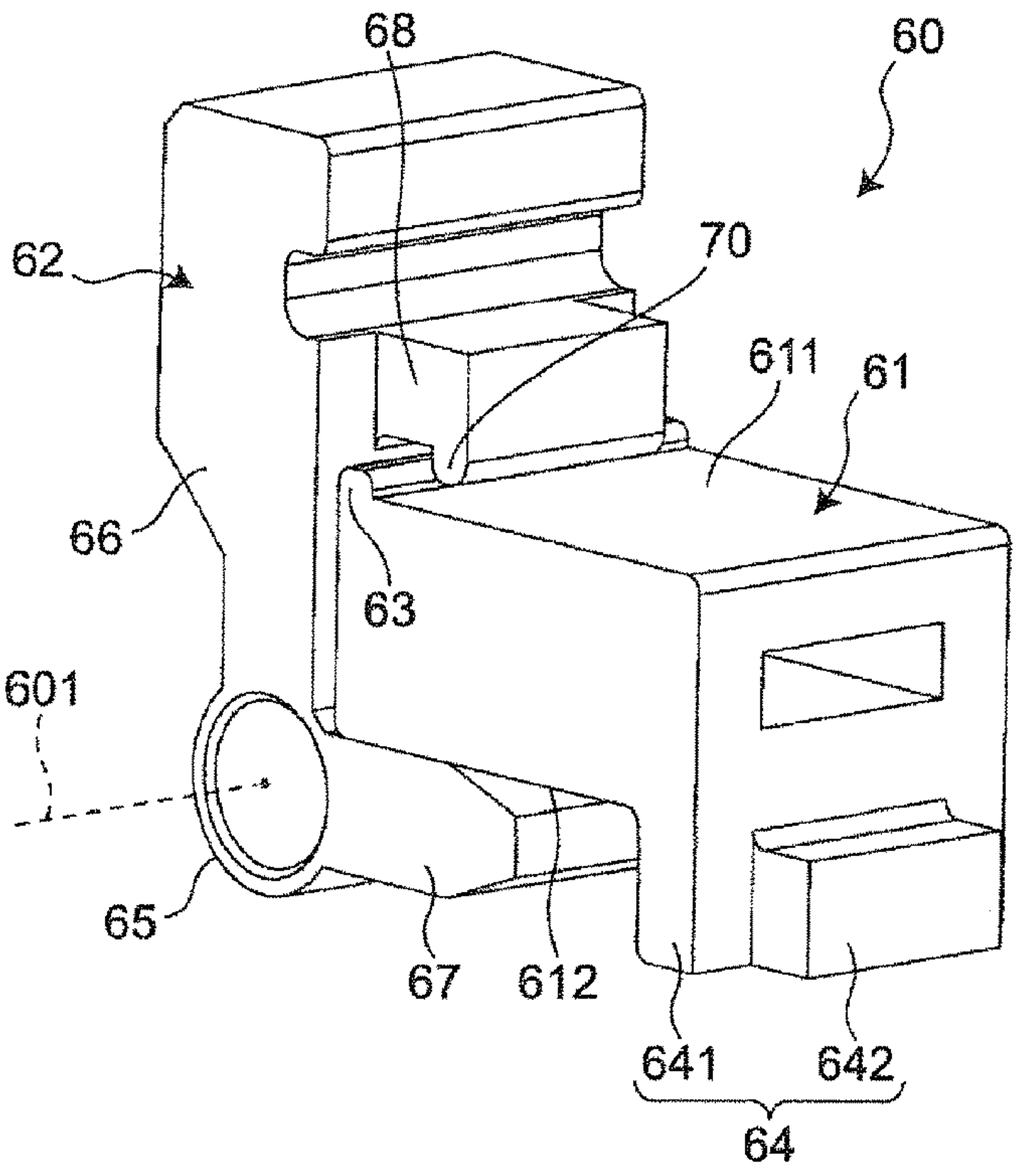
FIG. 13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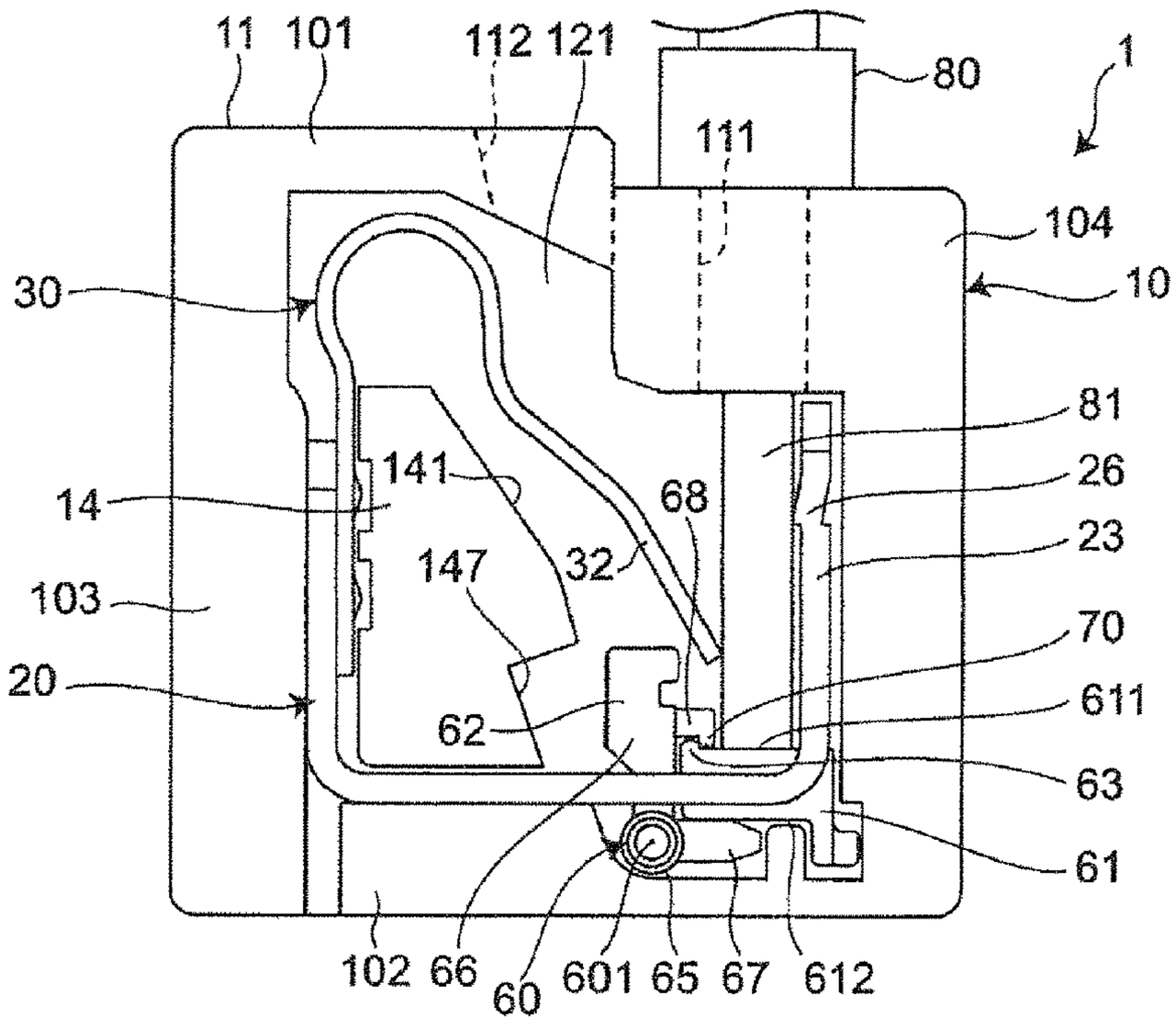
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FIG. 15

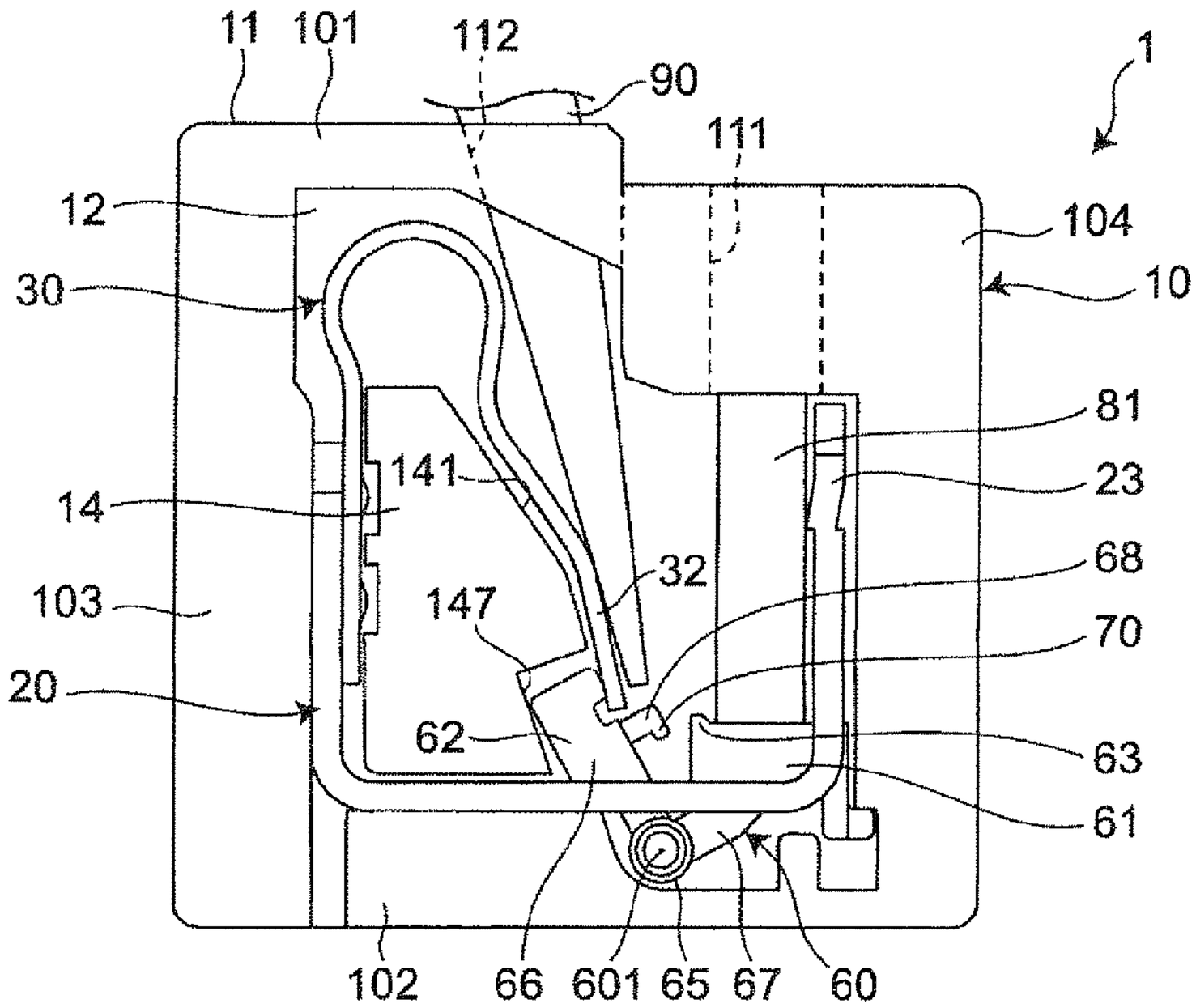
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FIG. 16

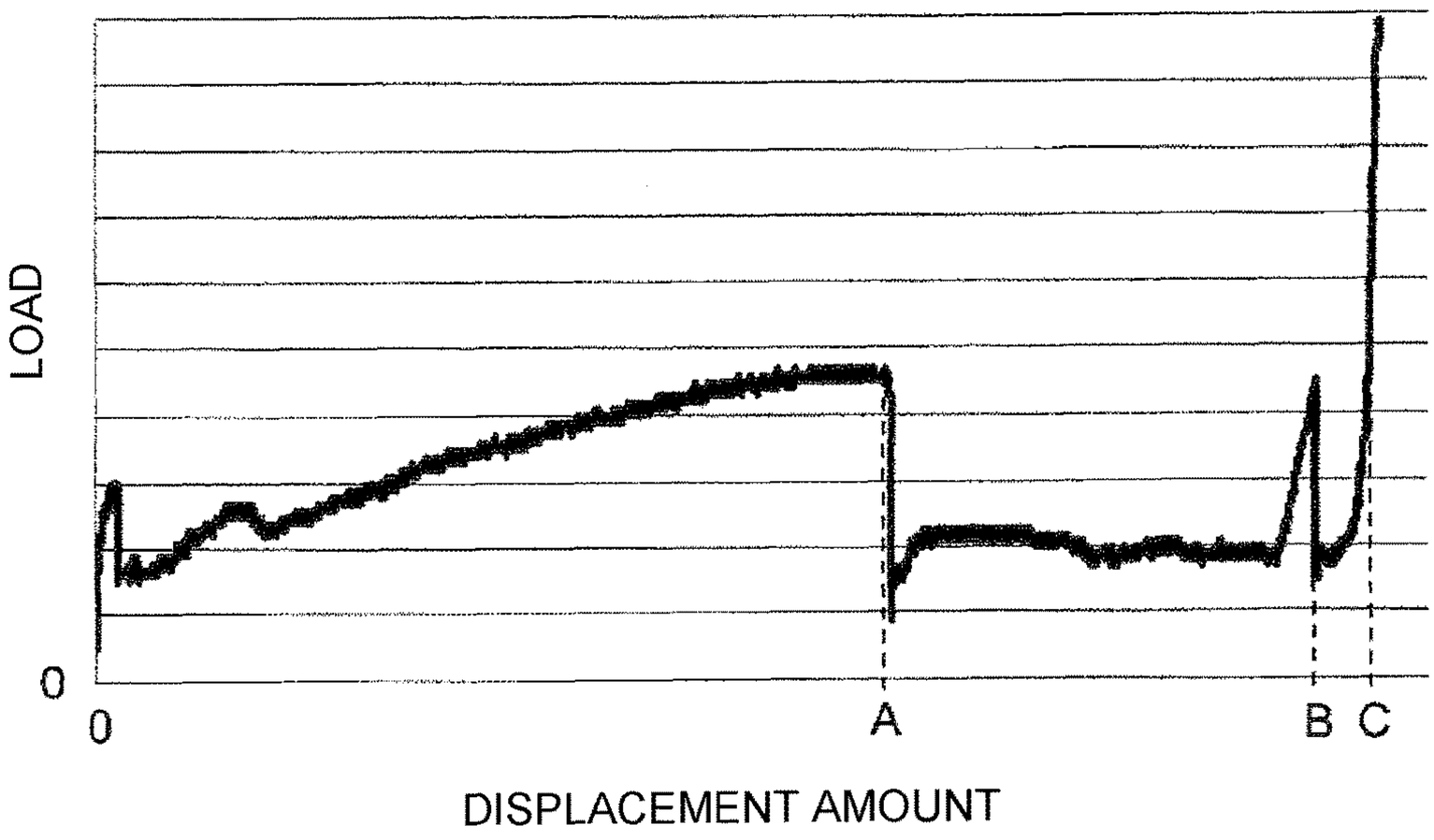

FIG. 17

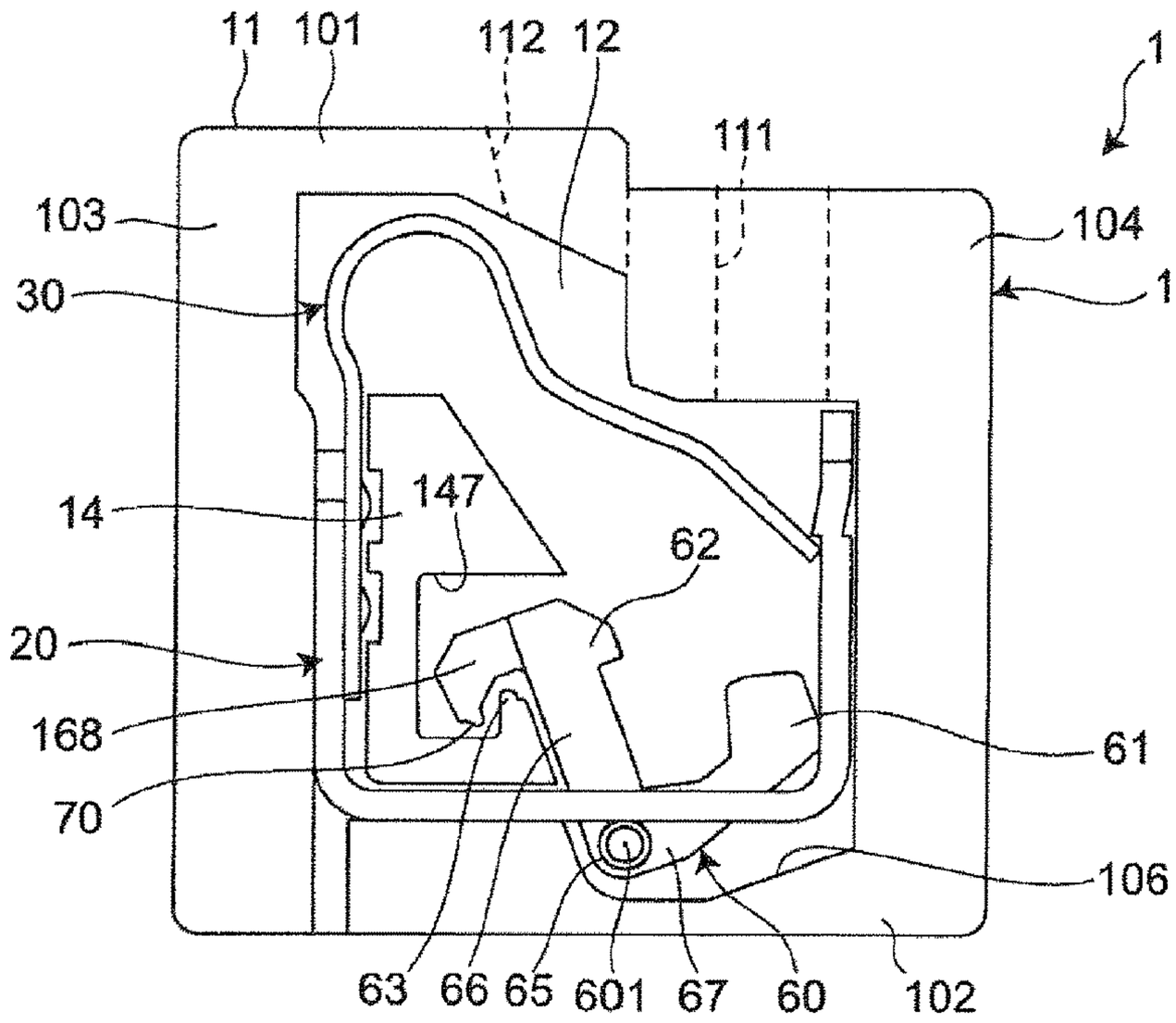
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FIG. 18

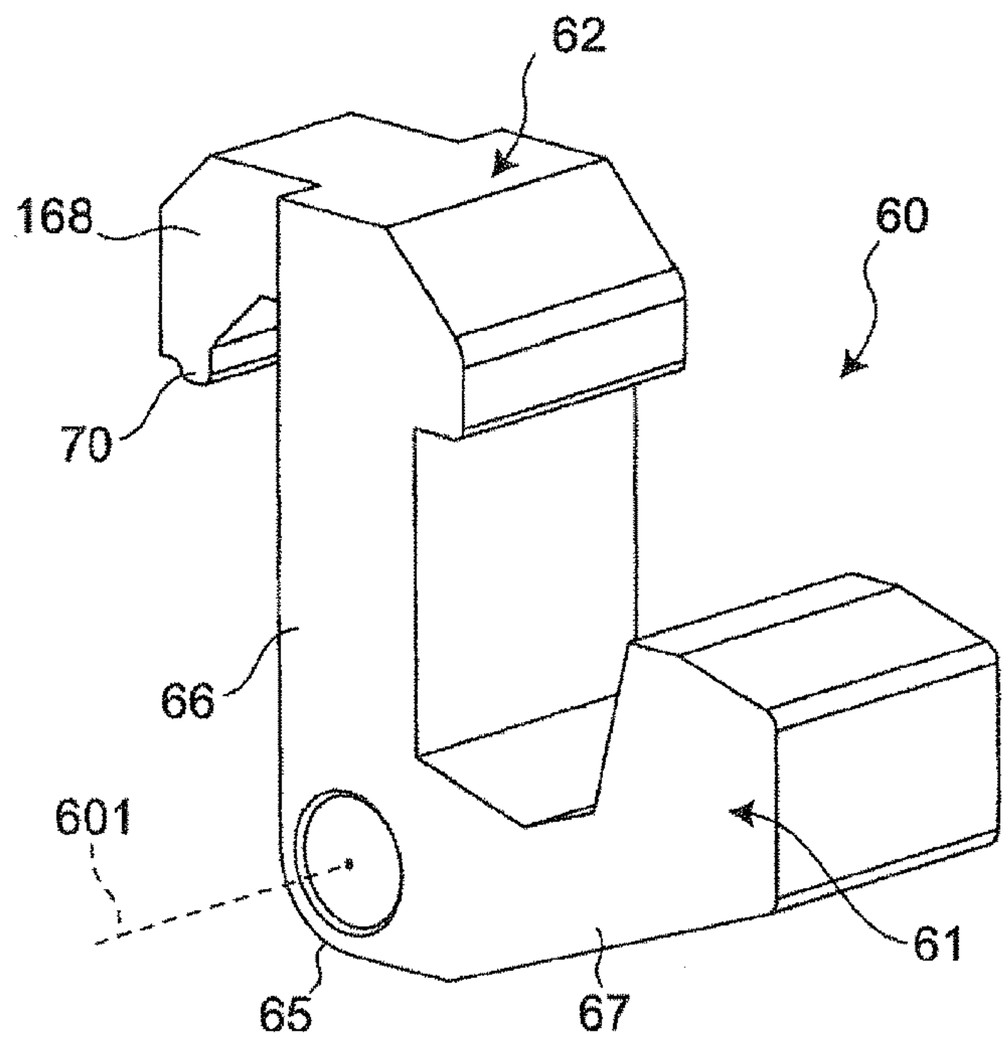
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FIG. 19

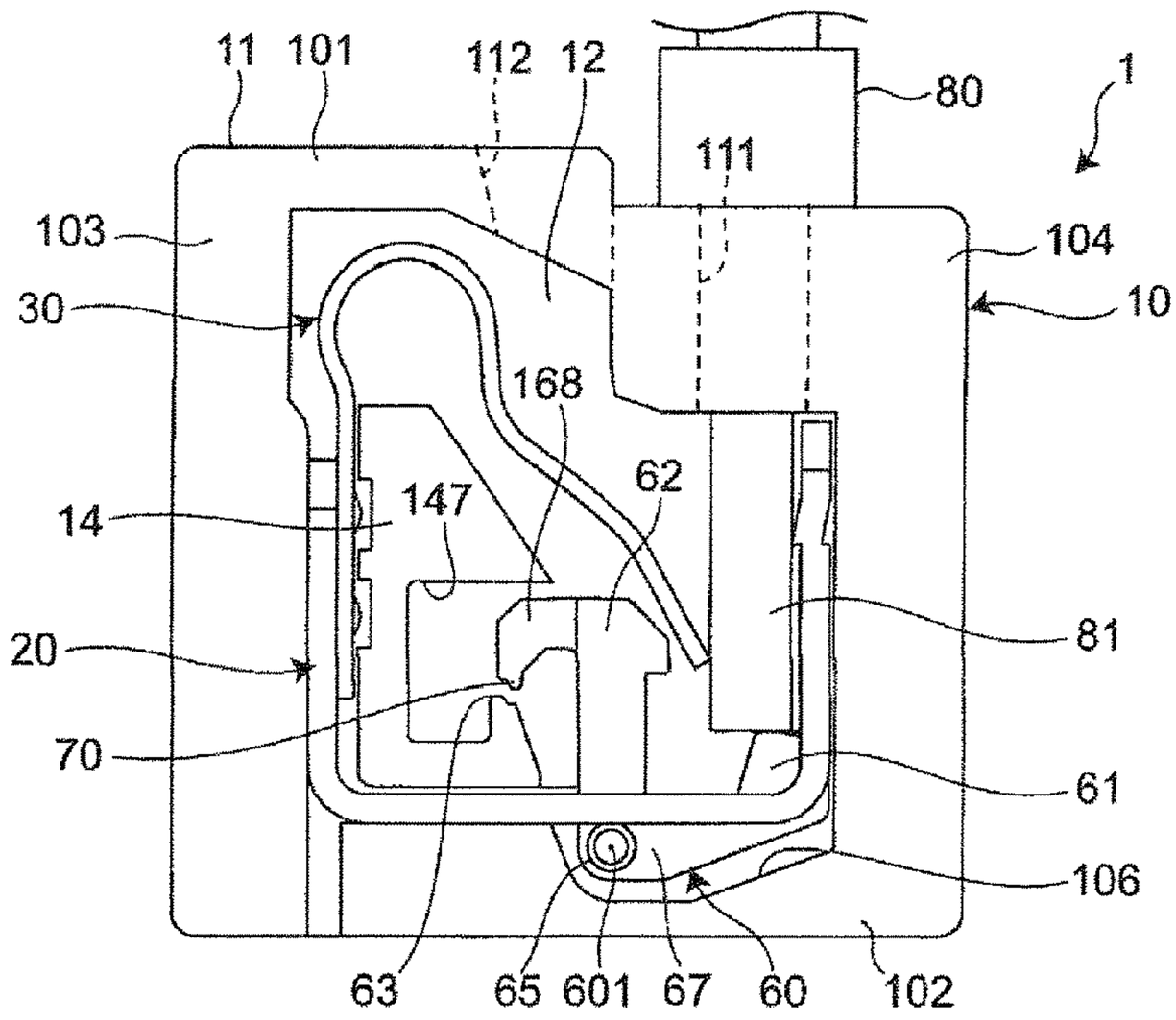
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FIG. 20

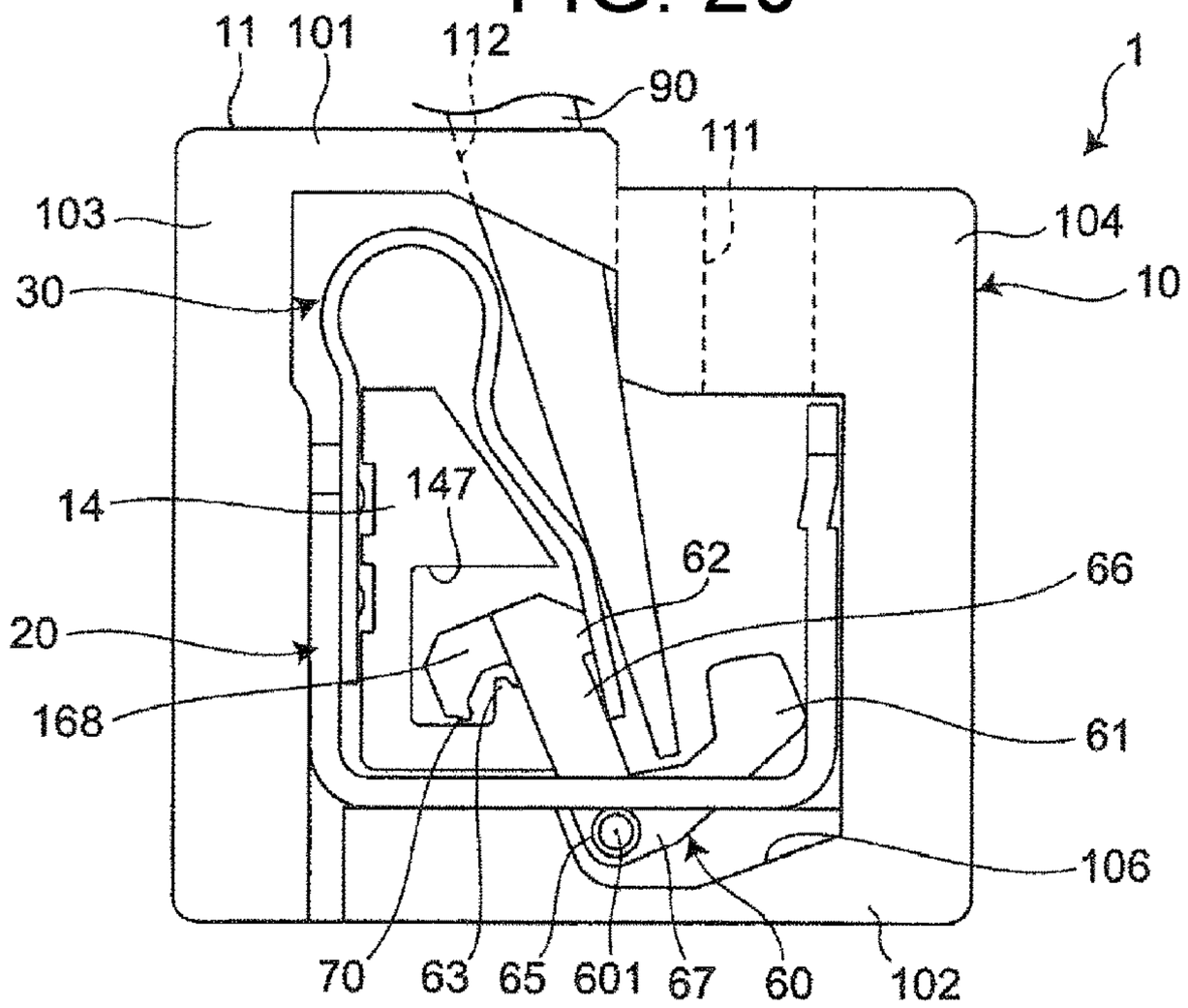
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FIG. 21

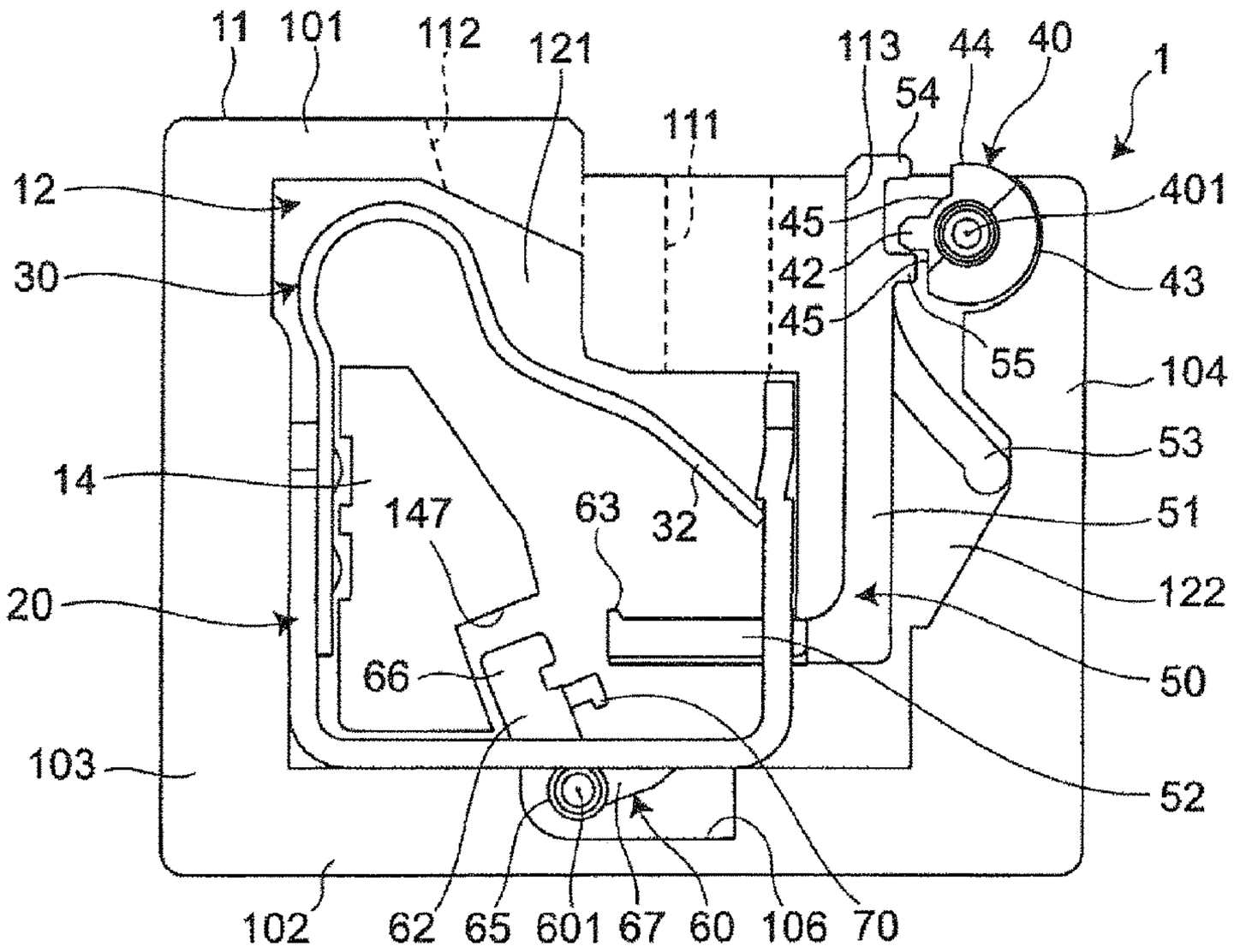
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FIG. 22

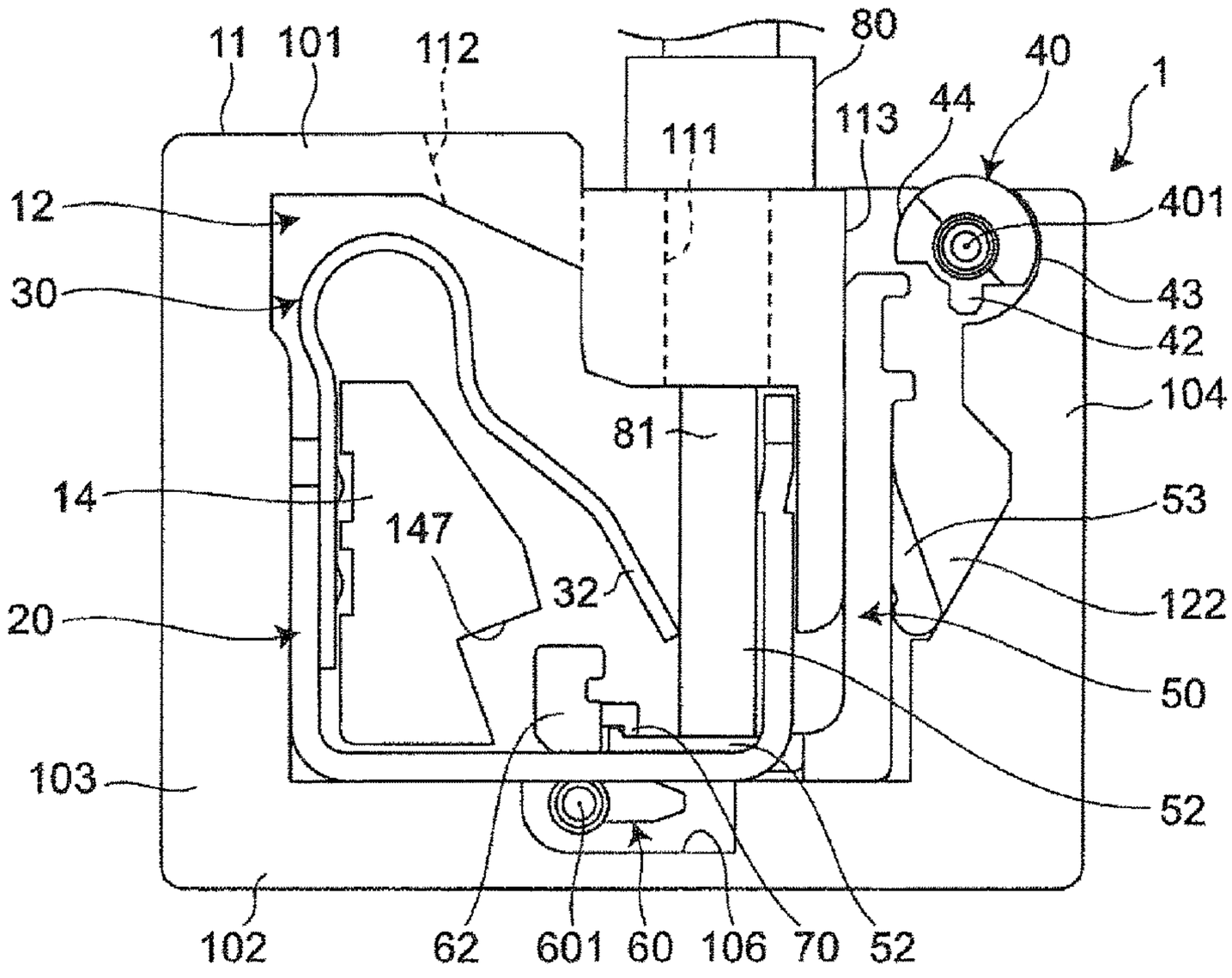
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FIG. 23

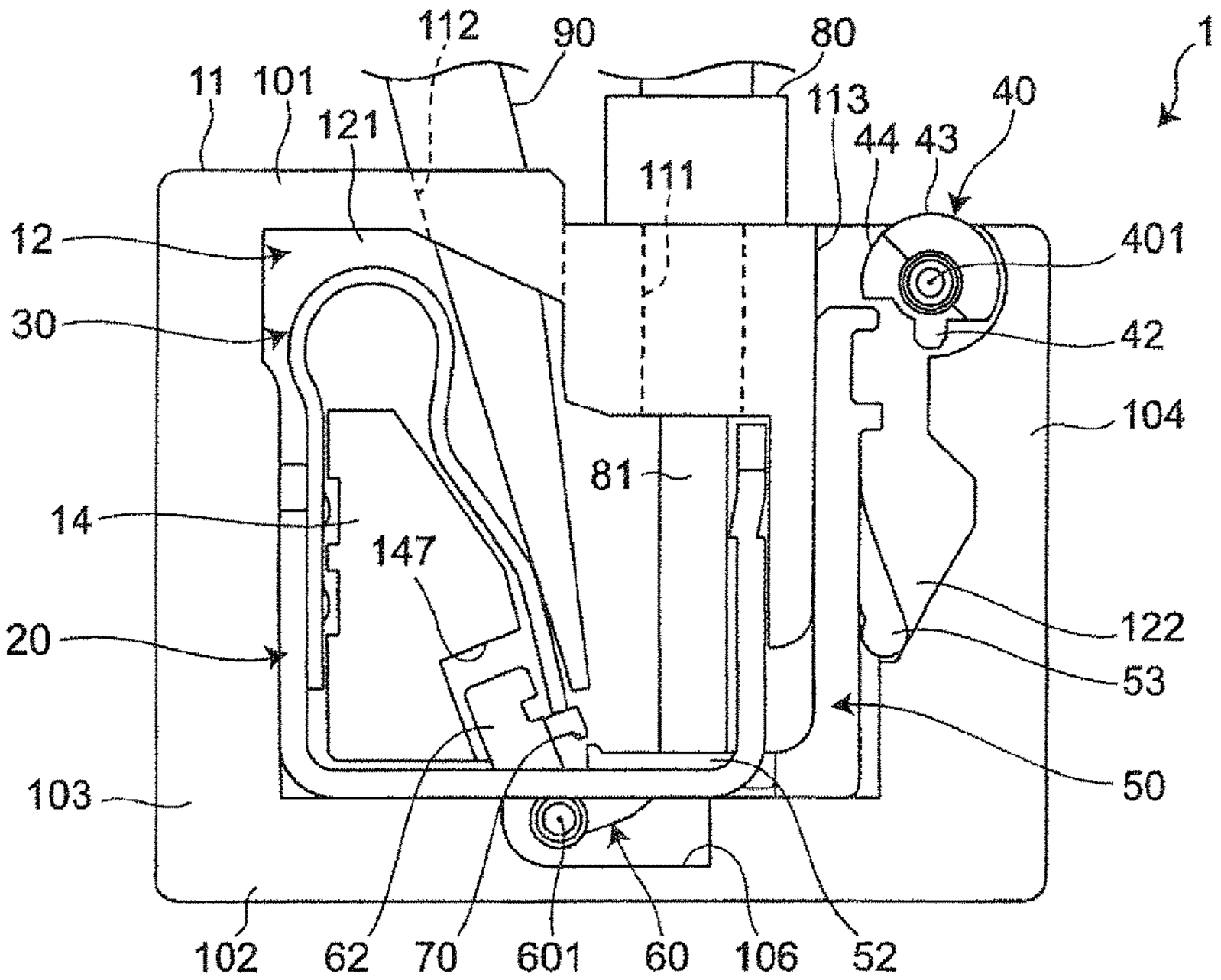
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FIG. 24

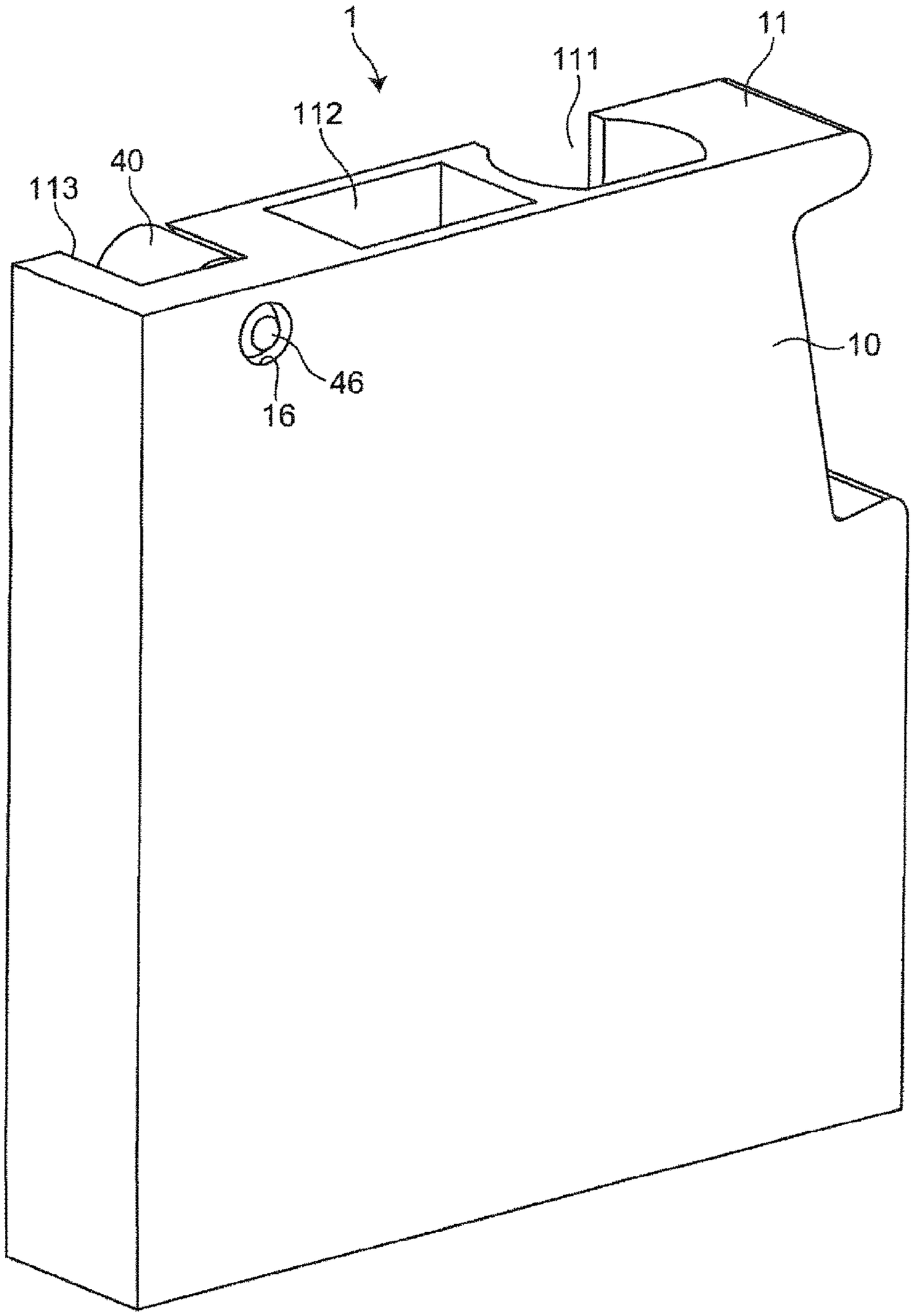

FIG. 25

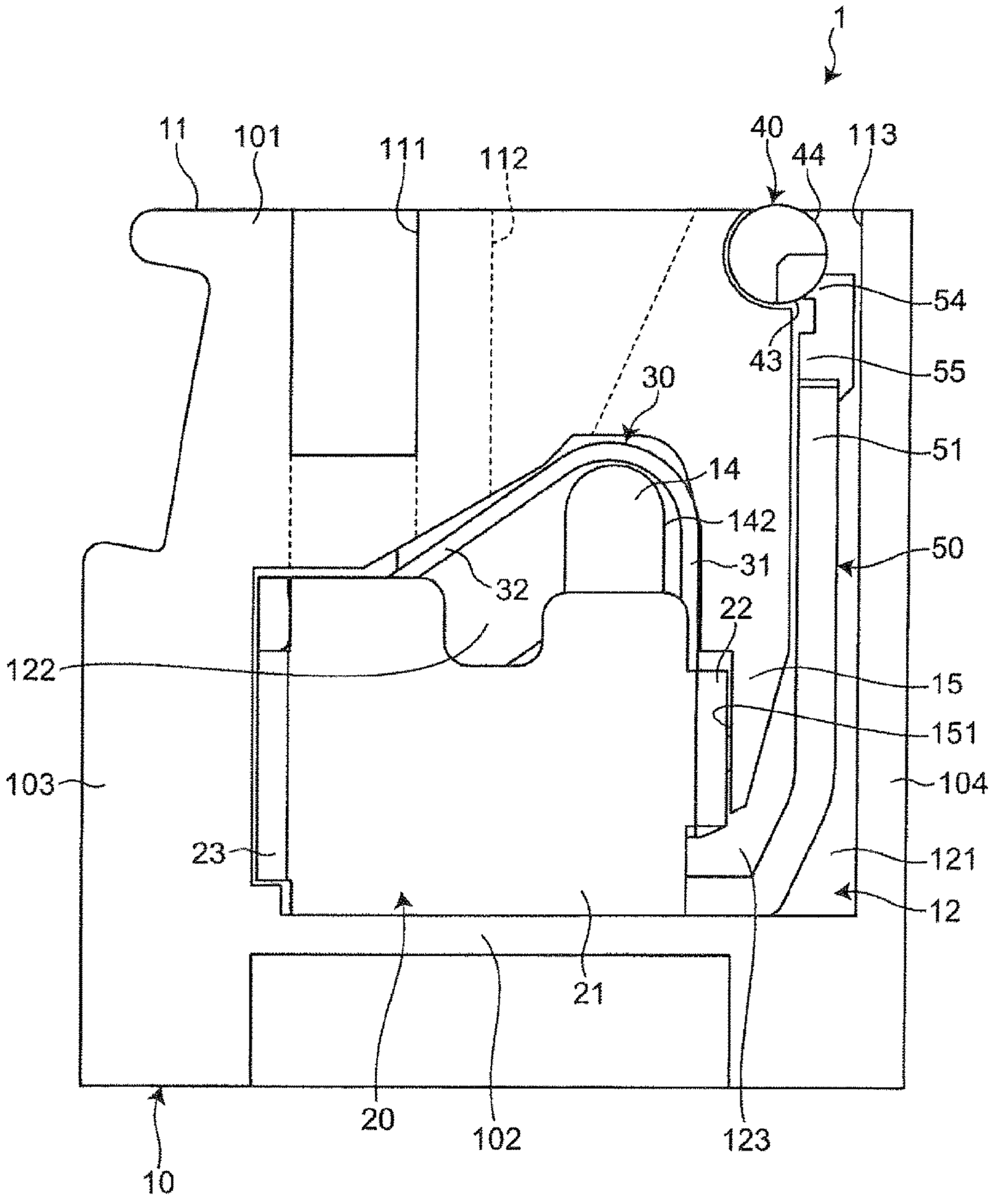
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FIG. 26

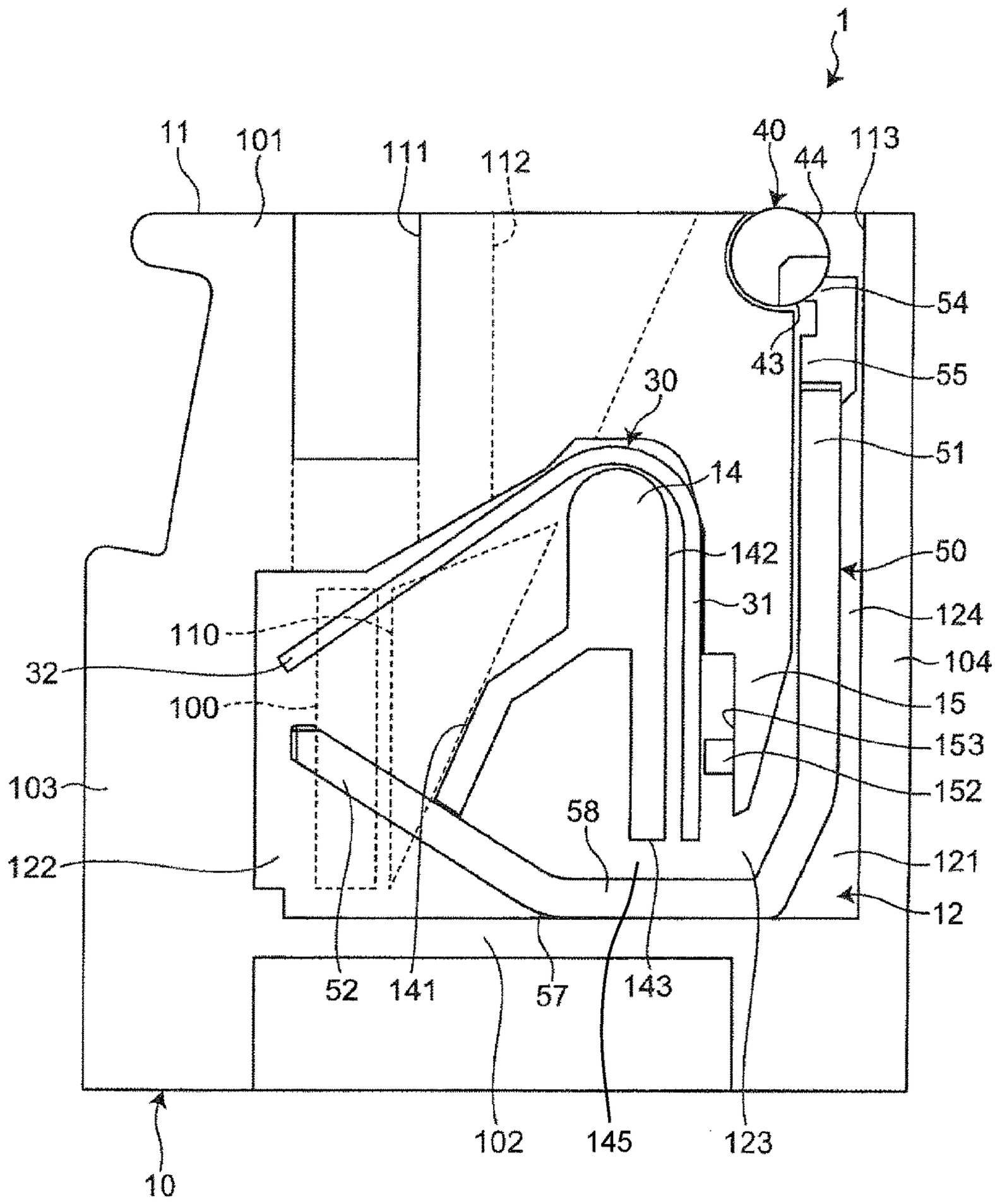
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FIG. 27

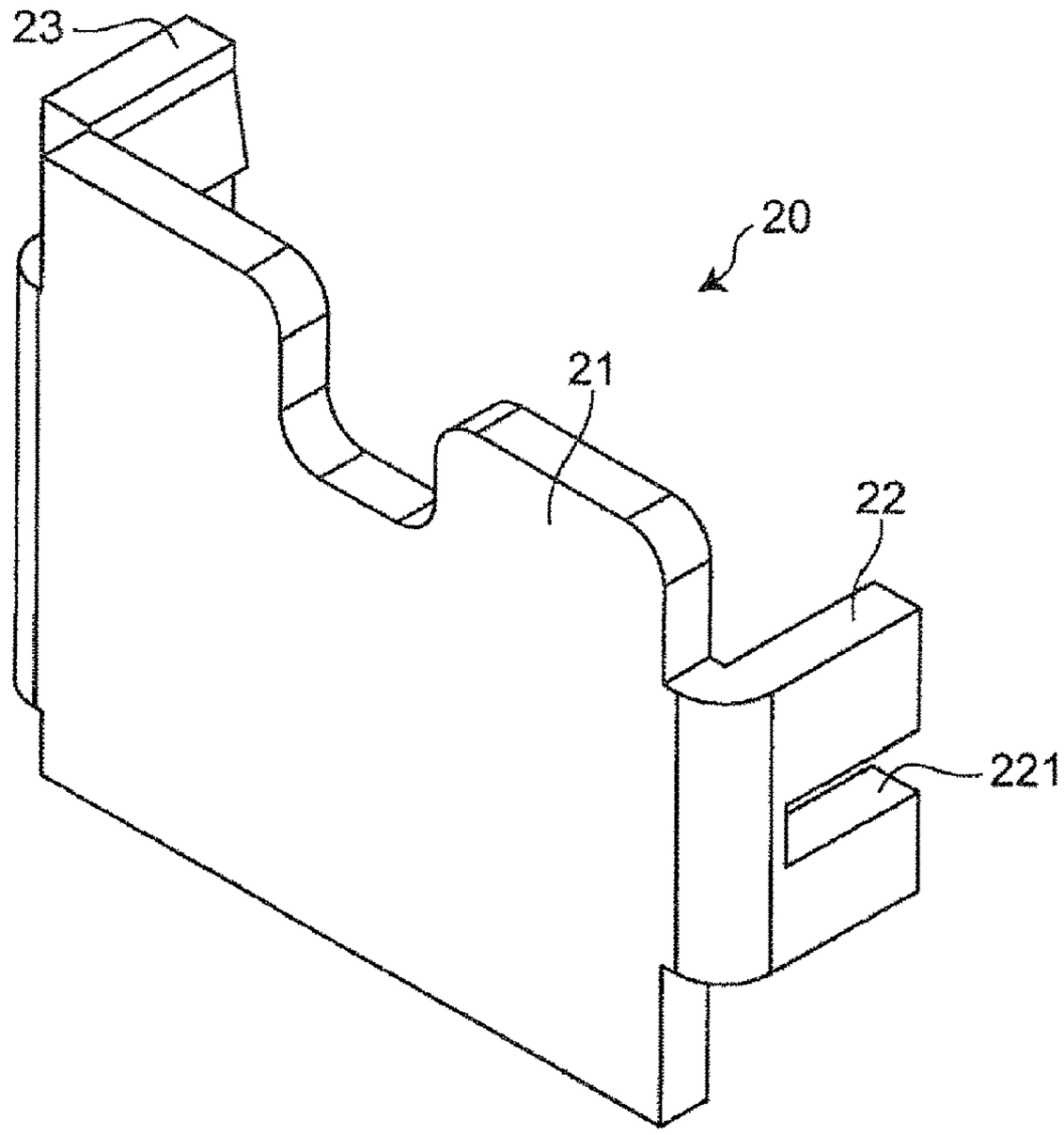

FIG. 28

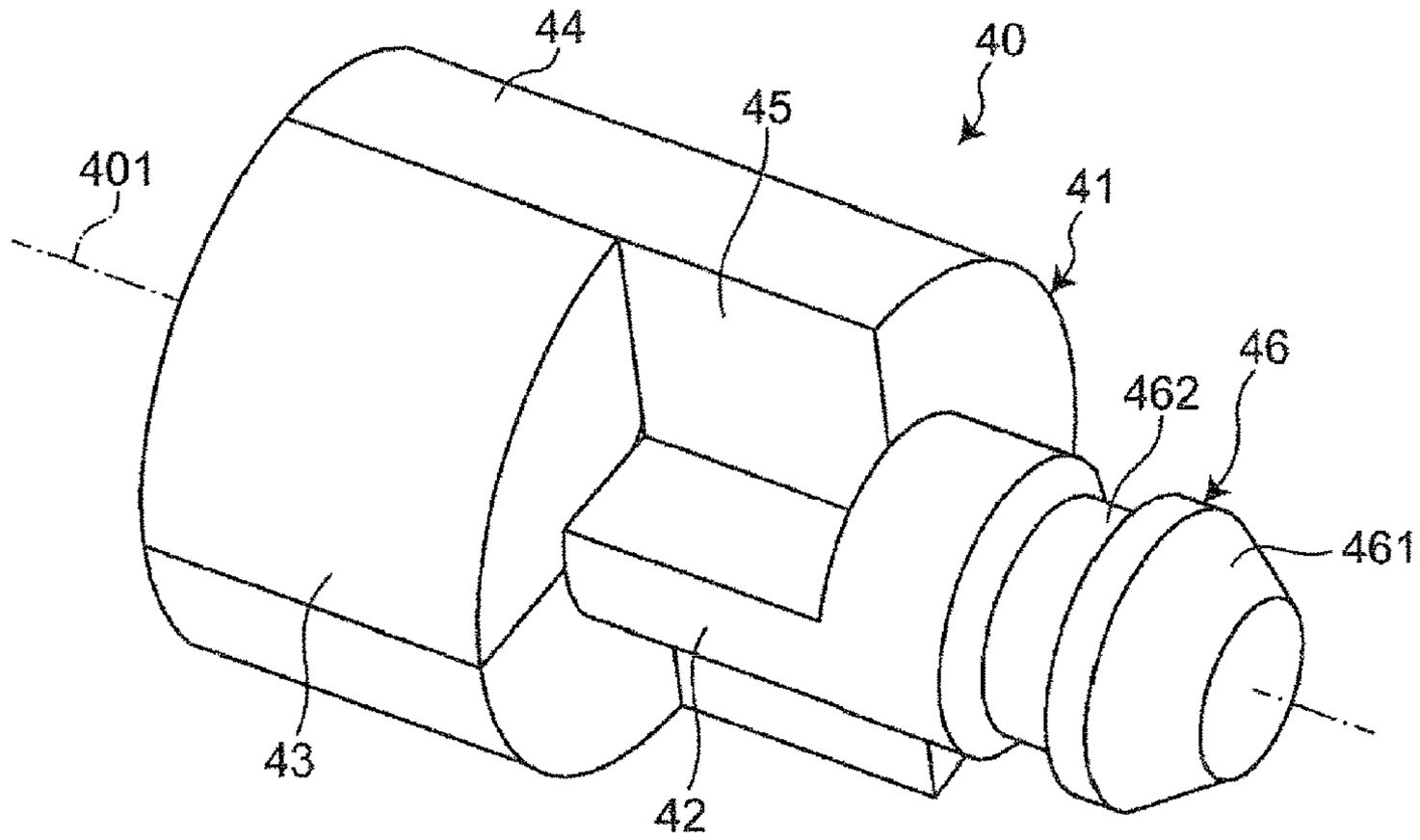

FIG. 29

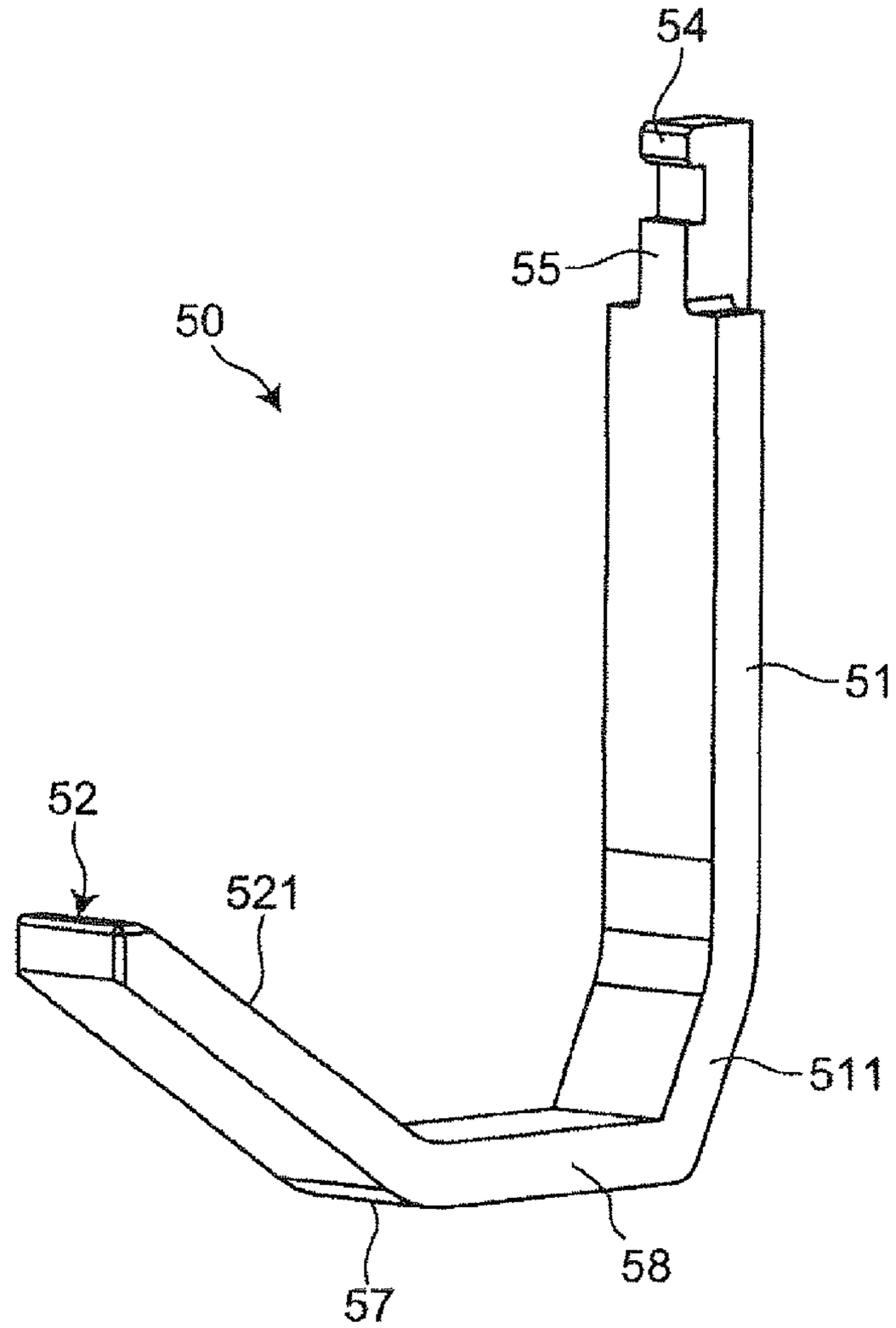

FIG. 30

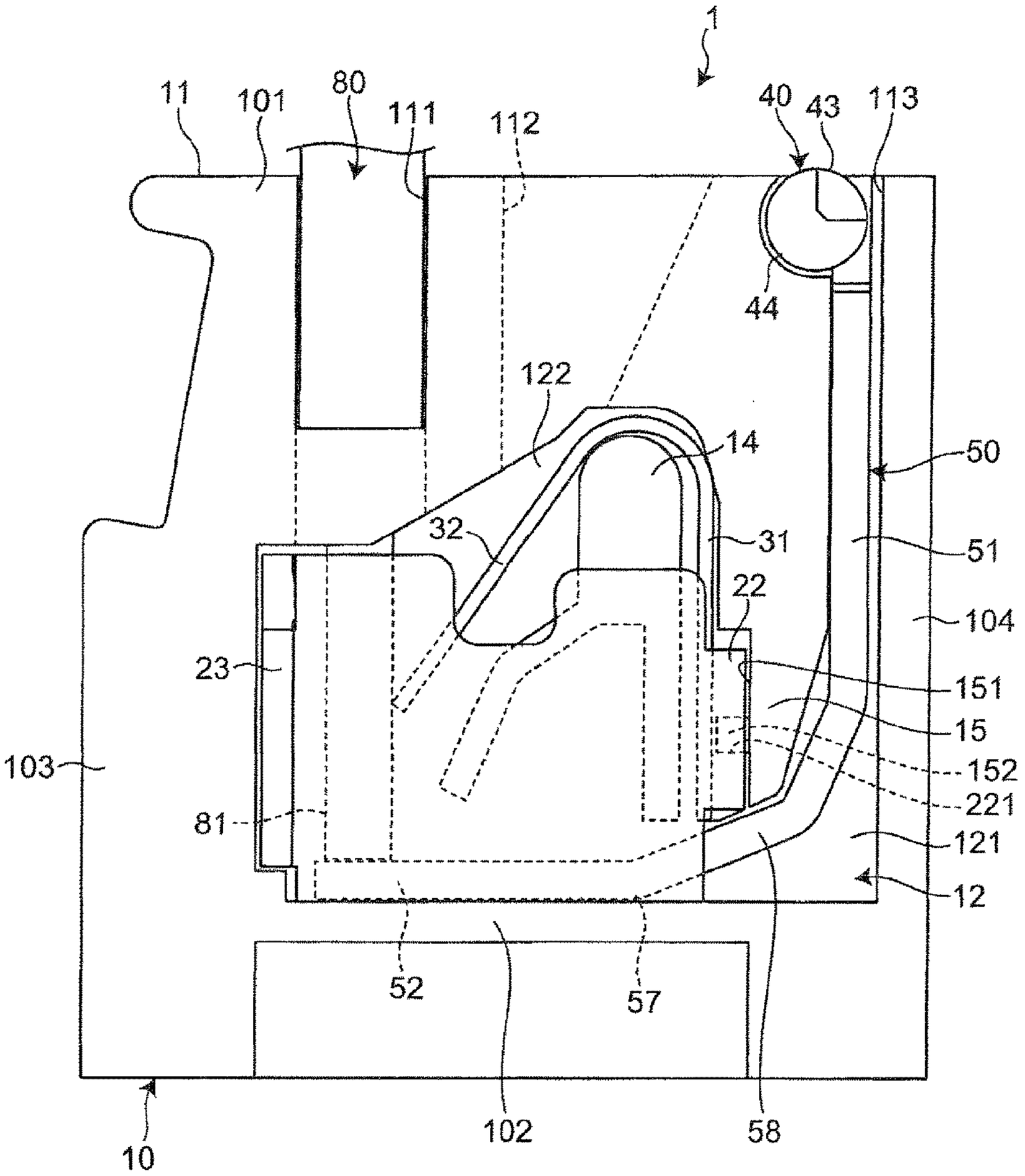
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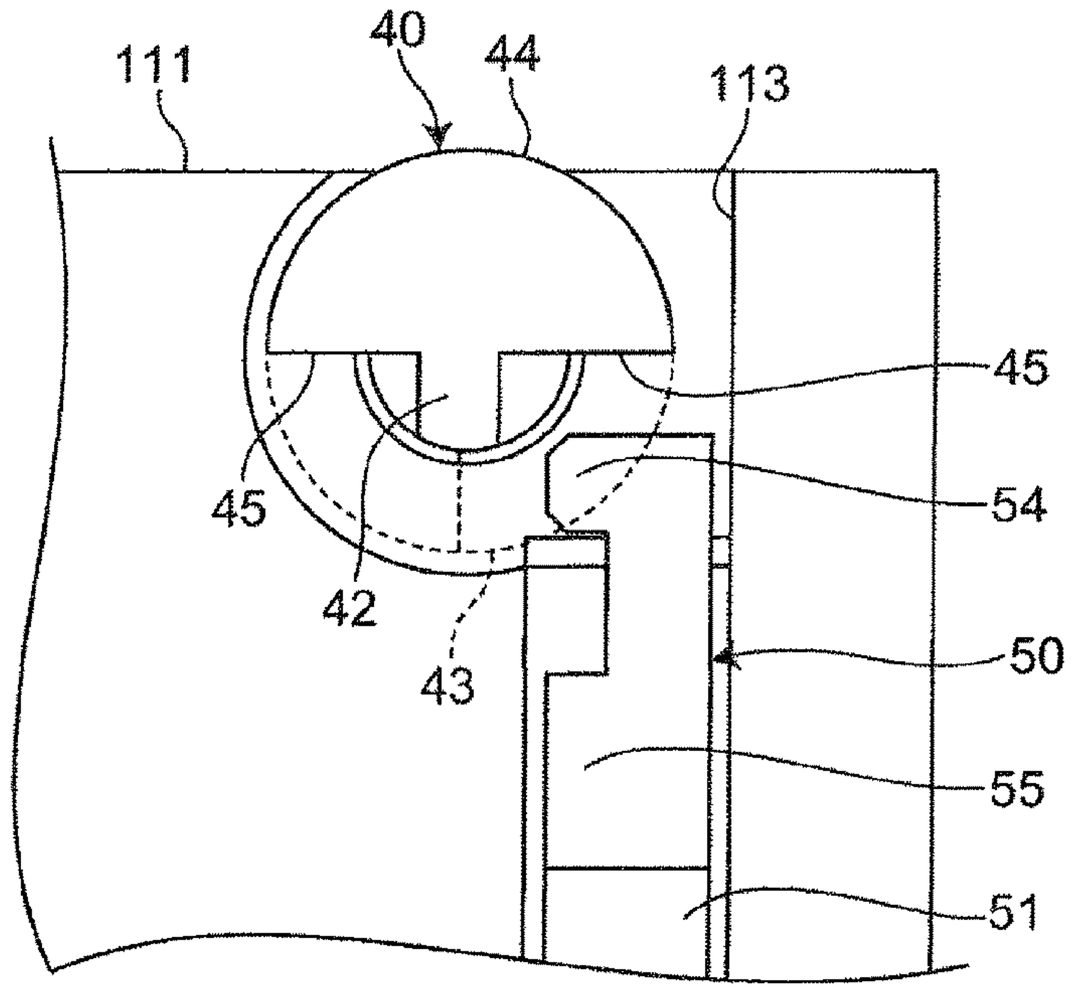
FIG. 31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113
45
45
54
42
43
50
55
51

FIG. 32

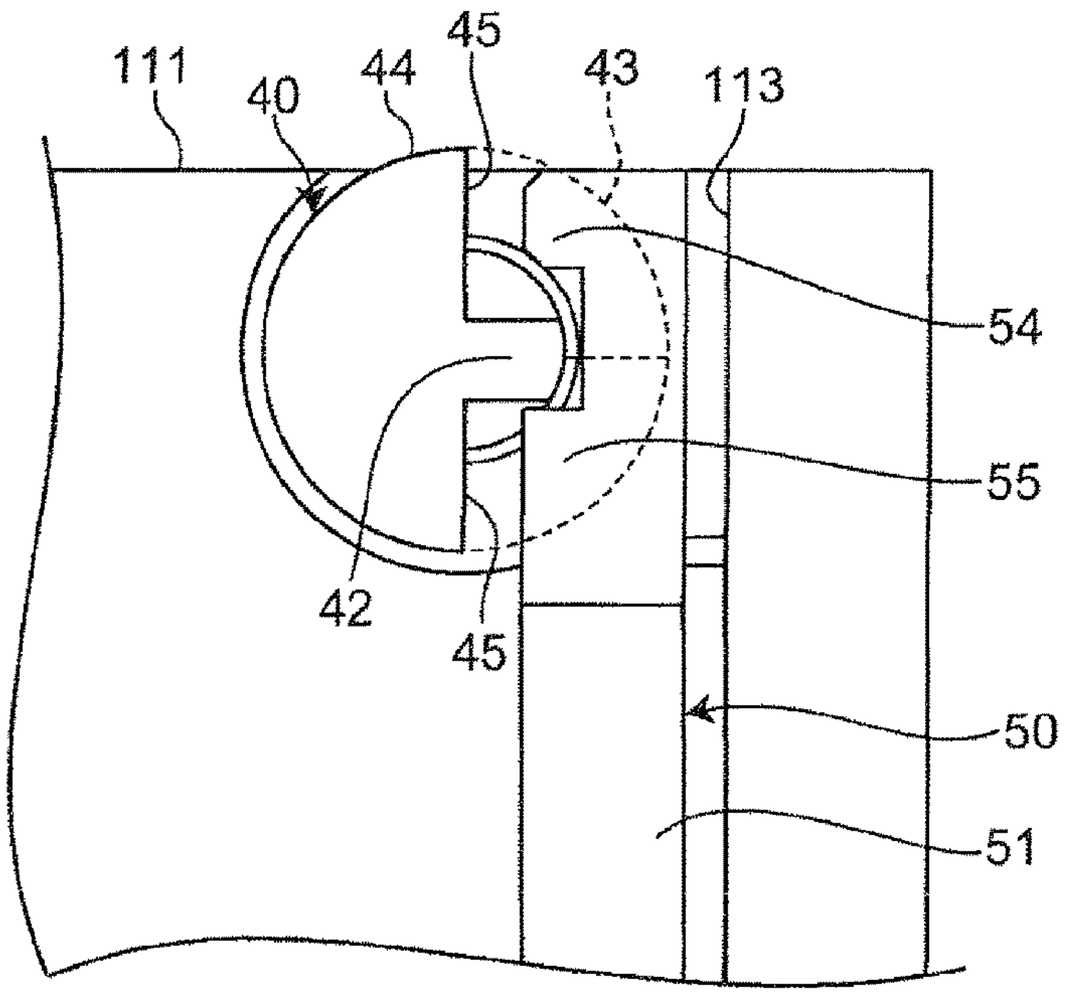
111
40
44
45
43
113
54
55
42
45
50
51

FIG. 33

TERMINAL BLOCK

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the priority benefits of Japan application serial no. 2017-037548, filed on Feb. 28, 2017, and Japan application serial no. 2017-088768, filed on Apr. 27, 2017. The entirety of each of the above-mentioned patent applications is hereby incorporated by reference herein and made a part of specification.

BACKGROUND OF THE INVENTION

Field of the Invention

The disclosure relates to a push-in connection terminal block.

Description of Related Art

Patent Document 1 discloses a terminal block having a housing which includes a terminal connection surface having an opening through which an electric wire can be inserted and pulled out and a confirmation window disposed close to the opening, and an accommodating portion provided at an inside thereof and connected to the opening. In the terminal block, an elongated display body which rotates around a rotation axis approximately at a center in a direction intersecting with the terminal connection surface of the accommodating portion according to inserting/pulling-out of the electric wire is provided in the accommodating portion. In the display body, a display portion which is provided at one end thereof in a lengthwise direction and is disposed to be exposed from the confirmation window by rotation of the display body is integrally provided, and a user is informed of a connection state of the electric wire according to whether or not the display portion is exposed from the confirmation window.

RELATED ART DOCUMENT

Patent Documents

[Patent Document 1] Japanese Utility Model Registered Publication No. 3098937

However, in the terminal block, a distance from the rotation axis of the display body to the display portion is long, and for example, in a small terminal block, there may be a case in which a rotation region of the display portion cannot be sufficiently secured in the accommodating portion. In this case, the display portion is always exposed from the confirmation window regardless of the connection state of the electric wire and there is concern that the user may not be notified of the accurate connection state of the electric wire.

SUMMARY OF THE INVENTION

Provided is a terminal block according to one aspect of the invention including an insulating housing having a terminal connection surface in which a first opening portion through which a conductor portion of an electric wire can be inserted and pulled out, a second opening portion which is adjacent to the first opening portion and through which a jig can be inserted and pulled out and a third opening portion are linearly arranged, and an accommodating portion which is

provided therein and connected to the first opening portion, the second opening portion and the third opening portion, a terminal electrode portion disposed in the accommodating portion and with which the conductor portion inserted into the accommodating portion from the first opening portion is able to come into contact, a leaf spring having a fixed portion formed at one end thereof to be fixed to the housing and an elastic portion formed at the other end thereof to be elastically deformable with respect to the fixed portion and disposed in the accommodating portion so that the elastic portion clamps the conductor portion inserted into the accommodating portion from the first opening portion with the terminal electrode portion to allow the conductor portion and the terminal electrode portion to be in a connected state, and the elastic portion comes into contact with the jig inserted into the accommodating portion from the second opening portion to release contact between the elastic portion and the conductor portion to allow the conductor portion and the terminal electrode portion to be in a non-connected state, a state display portion supported by the housing to be rotatable around a rotation axis disposed adjacent to the terminal connection surface of the accommodating portion and extending in a direction intersecting an arrangement direction from the first opening portion of the terminal connection surface to the third opening portion thereof and configured to display whether the conductor portion and the terminal electrode portion are in the connected state or the non-connected state at the third opening portion, and a movable display member disposed in the accommodating portion and including a main body portion which extends in a direction intersecting the terminal connection surface and is capable of reciprocating in the direction intersecting the terminal connection surface, a contact portion which is disposed adjacent to the terminal electrode portion and capable of coming into contact with the conductor portion inserted from the first opening portion into the accommodating portion, a force transmitting portion which is connected to the main body portion and moves the main body portion toward the terminal connection surface when the conductor portion is inserted from the first opening portion into the accommodating portion, and a rotating mechanism portion disposed to the main body portion and adjacent to the terminal connection surface and the state display portion and configured to rotate the state display portion so that display of the state display portion can be changed between the connection state and the non-connection state according to the reciprocating movement of the main body portion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a terminal block according to a first embodiment of the invention.

FIG. **2** is a front view of the terminal block of FIG. **1**.

FIG. **3** is a front view of a state in which a conductor portion of an electric wire is inserted into the terminal block of FIG. **1**.

FIG. **4** is a front view of a state in which the conductor portion of the electric wire and a jig are inserted into the terminal block of FIG. **1**.

FIG. **5** is a perspective view of a terminal electrode portion of the terminal block of FIG. **1**.

FIG. **6** is a perspective view of a movable display member of the terminal block of FIG. **1**.

FIG. **7** is a perspective view of a state display portion of the terminal block of FIG. **1**

FIG. **8** is a front view of a modified example of the terminal block of FIG. **1**.

FIG. **9** is a perspective view of the terminal electrode portion of the terminal block of FIG. **8**.

FIG. **10** is a perspective view of the movable display member of the terminal block of FIG. **8**.

FIG. **11** is a perspective view of the state display portion of the terminal block of FIG. **8**.

FIG. **12** is a perspective view of a terminal block according to a second embodiment of the invention.

FIG. **13** is a front view of the terminal block of FIG. **12**.

FIG. **14** is a perspective view of a movable operation feeling generating member of the terminal block of FIG. **12**.

FIG. **15** is a front view of a state in which a conductor portion of an electric wire is inserted into the terminal block of FIG. **12**.

FIG. **16** is a front view of a state in which the conductor portion of the electric wire and a jig are inserted into the terminal block of FIG. **12**.

FIG. **17** is a view for explaining an operation feeling of the terminal block of FIG. **12**.

FIG. **18** is a front view of a modified example of the terminal block of FIG. **12**.

FIG. **19** is a perspective view of the movable operation feeling generating member of the terminal block of FIG. **18**.

FIG. **20** is a front view of a state in which the conductor portion of the electric wire is inserted into the terminal block of FIG. **18**.

FIG. **21** is a front view of a state in which the conductor portion of the electric wire and a jig are inserted into the terminal block of FIG. **18**.

FIG. **22** is a plan view of a terminal block according to a third embodiment of the invention.

FIG. **23** is a front view of a state in which the conductor portion of the electric wire is inserted into the terminal block of FIG. **22**.

FIG. **24** is a front view of a state in which the conductor portion of the electric wire and a jig are inserted into the terminal block of FIG. **22**.

FIG. **25** is a perspective view of a terminal block according to a fourth embodiment of the invention.

FIG. **26** is a front view of the terminal block of FIG. **25**.

FIG. **27** is a front view of a state in which a terminal electrode portion of the terminal block of FIG. **25** is removed.

FIG. **28** is a perspective view of the terminal electrode portion of the terminal block of FIG. **25**

FIG. **29** is a perspective view of a state display portion of the terminal block of FIG. **25**.

FIG. **30** is a perspective view of a movable display member of the terminal block of FIG. **25**.

FIG. **31** is a front view of a state in which a conductor portion of an electric wire is inserted into the terminal block of FIG. **25**.

FIG. **32** is an enlarged view of the vicinity of the state display portion before the conductor portion of the electric wire is inserted into the terminal block of FIG. **25**.

FIG. **33** is an enlarged view of the vicinity of the state display portion after the conductor portion of the electric wire is inserted into the terminal block of FIG. **25**.

DESCRIPTION OF THE EMBODIMENTS

Some embodiments of the invention provide a terminal block which is capable of accurately notifying a user of a connection state of an electric wire.

According to the terminal block of one or some exemplary embodiments of the invention, the state display portion for displaying whether the conductor portion and the terminal electrode portion are in the connected state or the non-connected state is provided at the third opening portion. Accordingly, for example, even in the small-sized terminal block, it is possible to secure the rotation region of the state display portion in the accommodating portion and to inform the user of the accurate connection state of the electric wire.

Hereinafter, embodiments of the invention will be described with reference to the accompanying drawings. Further, in the following description, terms indicating a specific direction or position (for example, terms including "up," "down," "right," "left," "side," and "end") are used as necessary, but the use of these terms is intended to facilitate understanding of the invention with reference to the drawings, and the technical scope of the invention is not limited by the meanings of these terms. Furthermore, the following description is merely exemplary in nature and is not intended to limit the invention, an application thereof or a purpose thereof. Also, the drawings are schematic, and ratios of dimensions do not necessarily agree with actual ones.

First Embodiment

As illustrated in FIG. **1**, a terminal block **1** of the first embodiment includes an insulating housing **10** having a rectangular box shape. The housing **10** has a terminal connection surface **11** including a first opening portion **111** through which a conductor portion **81** (illustrated in FIGS. **6** and **7**) of an electric wire **80** can be inserted and pulled out, a second opening portion **112** through which a jig **90** (illustrated in FIG. **7**) can be inserted and pulled out, and a third opening portion **113**.

In the terminal block **1**, the terminal connection surface **11** is a rectangular surface formed on an upper portion of the housing **10** (that is, an upper surface in FIG. **1**), and the first opening portion **111**, the second opening portion **112** and the third opening portion **113** are provided to be arranged linearly to be spaced apart from each other at intervals in a lengthwise direction of the terminal connection surface **11**. The first opening portion **111** is disposed between the second opening portion **112** and the third opening portion **113**. That is, each of the second opening portion **112** and the third opening portion **113** is adjacent to the first opening portion **111**.

As illustrated in FIG. **2**, the housing **10** includes a first wall portion **101** which has the terminal connection surface **11**, a second wall portion **102** which faces the first wall portion **101**, and a third wall portion **103** and a fourth wall portion **104** which are substantially orthogonal to the first wall portion **101** and the second wall portion **102** and face each other, and one surface thereof in a thickness direction (that is, a surface on a near side in a drawing penetration direction in FIG. **2**) is open.

Further, the housing **10** is provided in an inside surrounded by the first to fourth wall portions **101**, **102**, **103** and **104** and has an accommodating portion **12** connected to the first opening portion **111**, the second opening portion **112** and the third opening portion **113**. The accommodating portion **12** is configured with a first region **121** to which the first opening portion **111** and the second opening portion **112** are connected and a second region **122** to which the third opening portion **113** is connected, a terminal electrode portion **20** and a leaf spring **30** are accommodated in the first region **121**, and a state display portion **40** and a movable display member **50** are accommodated in the second region

122. Furthermore, an inner surface of the second wall portion 102 facing the terminal connection surface 11 is defined as a bottom surface of the accommodating portion 12.

The first region 121 and the second region 122 of the accommodating portion 12 are partitioned by an electric wire insertion guide wall portion 13 which extends from the first opening portion 111 in a direction (that is, a vertical direction in FIG. 2) intersecting (for example, substantially orthogonal to) the terminal connection surface 11 to support the terminal electrode portion 20. Further, a first passage portion 123 connected to the first region 121 and the second region 122 is provided between the electric wire insertion guide wall portion 13 and the second wall portion 102.

An inclined wall portion 14 having an approximately trapezoid shape in a plan view in the thickness direction of the housing 10 is provided in the first region 121 of the accommodating portion 12. The inclined wall portion 14 includes a leaf spring inclined surface 141 which faces the electric wire insertion guide wall portion 13 and is inclined to approach the electric wire insertion guide wall portion 13 in an insertion direction (that is, from an upper side toward a lower side in FIG. 2) of the electric wire 80, a first gap forming surface 142 which faces the third wall portion 103 and extends substantially in parallel with the electric wire insertion guide wall portion 13, and a second gap forming surface 143 which faces the second wall portion 102 and extends in a direction substantially orthogonal to the first gap forming surface 142.

An electric wire insertion region 100 which is a region in which the conductor portion 81 of the electric wire 80 may be inserted through the first opening portion 111, and a jig insertion region 110 which is a region in which the jig 90 may be inserted through the second opening portion 112 are provided between the leaf spring inclined surface 141 and the electric wire insertion guide wall portion 13. Gaps 144 and 145 in which the terminal electrode portion 20 can be disposed are respectively provided between the first gap forming surface 142 and the third wall portion 103 and between the second gap forming surface 143 and the second wall portion 102.

Also, two through-holes 146 which pass through the second wall portion 102 in the direction intersecting (for example, substantially orthogonal to) the terminal connection surface 11 and are connected to an outside of the housing 10 are provided in the second wall portion 102. The through-holes 146 are disposed in portions of the second wall portion 102 corresponding to both end portions of a transverse plate portion 21 of the terminal electrode portion 20 which will be described later.

In the second region 122 of the accommodating portion 12, a second passage portion 124 which is defined by the electric wire insertion guide wall portion 13 and the fourth wall portion 104 and extends in the direction intersecting (for example, substantially orthogonal to) the terminal connection surface 11 to be connected to the first passage portion 123 and the third opening portion 113 is provided. In the vicinity of the third opening portion 113 of the second passage portion 124, a display accommodating portion 125 for accommodating the state display portion 40 is provided.

Further, a first movable member inclined surface 126 and a second movable member inclined surface 127 are provided at the second passage portion 124 and between the first passage portion 123 of and the display accommodating portion 125. The first movable member inclined surface 126 is provided on the fourth wall portion 104 closer to the second wall portion 102 than the first wall portion 101 having the terminal connection surface 11 in the direction intersecting the terminal connection surface 11 and is inclined away from the electric wire insertion guide wall portion 13 as it approaches the third opening portion 113 of the terminal connection surface 11. The first movable member inclined surface 126 is in contact with an elastic arm portion 53 of the movable display member 50 to be described later and generates a biasing force for biasing the movable display member 50 toward the terminal connection surface 11. Also, the second movable member inclined surface 127 is provided on the fourth wall portion 104 closer to the first wall portion 101 than the second wall portion 102 in the direction intersecting the terminal connection surface 11 and is inclined to approach the electric wire insertion guide wall portion 13 as it approaches the third opening portion 113 of the terminal connection surface 11. The second movable member inclined surface 127 is in contact with the elastic arm portion 53 of the movable display member 50 and restricts movement of the movable display member 50 in a direction toward the terminal connection surface 11.

As illustrated in FIGS. 2 and 3, the terminal electrode portion 20 has substantially a U shape in a plan view in the thickness direction of the housing 10 and is configured with the rectangular plate-like transverse plate portion 21 which is a plate-like body and extends substantially in parallel with the terminal connection surface 11, and a first vertical plate portion 22 and a second vertical plate portion 23 which extend from both longitudinal ends of the transverse plate portion 21 in the direction substantially orthogonal to the terminal connection surface 11. As illustrated in FIG. 2, the transverse plate portion 21 of the terminal electrode portion 20 is disposed in the gap 145 between the second gap forming surface 143 and the second wall portion 102, the first vertical plate portion 22 is disposed in the gap 144 between the first gap forming surface 142 and the third wall portion 103, and the second vertical plate portion 23 is disposed along the electric wire insertion guide wall portion 13.

As illustrated in FIG. 3, a rectangular through-hole 24 passing through the terminal electrode portion 20 in a plate thickness direction is provided in a center portion of the terminal electrode portion 20 in a width direction. The rectangular through-hole 24 extends over the transverse plate portion 21 and a part of each of the vertical plate portions 22 and 23, and as illustrated in FIG. 2, a contact portion 52 of the movable display member 50 which will be described is disposed therein. Fixing holes 25 for fixing the terminal electrode portion 20 to the housing 10 with a fastening member (not illustrated) are provided in the first vertical plate portion 22. Also, a protruding portion 26 protruding toward the first vertical plate portion 22 is provided on the second vertical plate portion 23. In addition, the rectangular through-hole 24 of the second vertical plate portion 23 is provided so as not to hinder movement of the movable display member 50 in the direction intersecting the terminal connection surface 11.

As illustrated in FIG. 2, the leaf spring 30 includes a fixed portion 31 formed at one end thereof, an elastic portion 32 formed at the other end thereof to be elastically deformable with respect to the fixed portion 31, and a curved portion 33 connecting the fixed portion 31 and the elastic portion 32. The fixed portion 31 is fixed to the first vertical plate portion 22 of the terminal electrode portion 20. A plate surface of the elastic portion 32 has a shape corresponding to the leaf spring inclined surface 141 of the inclined wall portion 14, and a distal end thereof extends to the terminal electrode

portion **20** and is in contact with the protruding portion **26**. The elastic portion **32** is configured to pass (across) the electric wire insertion region **100** toward the fixed portion **31** and to be elastically deformable to the jig insertion region **110**.

The elastic portion **32** clamps the conductor portion **81** of the electric wire **80** inserted into the first region **121** of the accommodating portion **12** via the first opening portion **111** with the second vertical plate portion **23** of the terminal electrode portion **20** so that the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** can be connected (refer to FIG. **6**). Also, the elastic portion **32** comes into contact with the jig **90** inserted into the first region **121** of the accommodating portion **12** from the second opening portion **112** so that the contact between the elastic portion **32** and the conductor portion **81** of the electric wire **80** can be released (refer to FIG. **7**).

As illustrated in FIG. **2**, at the third opening portion **113**, the state display portion **40** displays a connected state in which the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are connected or a non-connected state in which the contact between the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** is released. The state display portion **40** is disposed in the display accommodating portion **125** of the second region **122** of the accommodating portion **12** and is supported by the housing **10** to be rotatable around a rotation axis **401** extending in a direction intersecting an arrangement direction from the first opening portion **111** of the terminal connection surface **11** to the third opening portion **113** thereof (that is, the drawing penetrating direction in FIG. **2**).

Specifically, as illustrated in FIG. **4**, the state display portion **40** includes a cylindrical body **41** of which a center axis is the rotation axis **401**, and a cut-out portion **45** which is provided on a part of an outer circumference of the cylindrical body **41** and extends along the central axis. A protruding portion **42** which protrudes in a direction intersecting (for example, substantially orthogonal to) the rotation axis **401** is provided at the outer circumference of the cylindrical body **41** in an intermediate portion of the cut-out portion **45**. Further, a ratio of the cut-out portion **45** to an area of the cylindrical body **41** in a plan view in a direction of the rotation axis **401** is smaller than ½.

Furthermore, a connection display region **43** and a non-connection display region **44** are provided on an outer circumferential surface of the cylindrical body **41** with respect to the rotation axis **401** other than the cut-out portion **45**. The connection display region **43** is, for example, a region which is colored with a conspicuous color such as red or yellow, and the non-connection display region **44** is, for example, a region which is colored with the same color as that of a material of the cylindrical body **41** (or a non-colored region when the state display portion **40** is formed of the same material as that of the cylindrical body **41**). As illustrated in FIG. **2**, a part of an outer circumferential surface of the state display portion **40** protrudes slightly from the terminal connection surface **11** toward an outside of the housing **10**.

As illustrated in FIG. **2**, the movable display member **50** includes a main body portion **51**, the contact portion **52**, the elastic arm portion **53** as an example of a biasing portion which is an example of a force transmitting portion, and a first pawl portion **54** and a second pawl portion **55** as an example of a rotating mechanism portion.

As illustrated in FIG. **2**, the main body portion **51** has a substantially rectangular plate shape which extends in the direction intersecting (for example, substantially orthogonal to) the terminal connection surface **11** and is disposed in the second passage portion **124** to reciprocate in the direction intersecting the terminal connection surface **11**. As illustrated in FIG. **5**, a through-hole **56** passing through the main body portion **51** in the plate thickness direction is provided at approximately a center of the main body portion **51**.

As illustrated in FIG. **2**, the contact portion **52** is provided to protrude from a lower end of the main body portion **51** in a lengthwise direction of a plate surface facing the electric wire insertion guide wall portion **13** toward the first region **121** and is disposed in the first passage portion **123**. That is, the contact portion **52** is disposed to the main body portion **51** and adjacent to the terminal electrode portion **20**. As illustrated in FIG. **5**, the contact portion **52** has a rectangular bar shape and also has a contact surface **521** on an upper surface thereof (that is, a surface facing the terminal connection surface **11**). The contact surface **521** is disposed to be capable of coming into contact with the conductor portion **81** of the electric wire **80** inserted into the first region **121** of the accommodating portion **12** via the first opening portion **111**.

When the conductor portion **81** of the electric wire **80** is inserted from the first opening portion **111** into the first region **121** of the accommodating portion **12**, the contact portion **52** which is in contact with the conductor portion **81** of the electric wire **80** is pressed in a direction intersecting the terminal connection surface **11** (that is, a downward direction in FIG. **2**) and also away from the terminal connection surface **11**. Accordingly, the main body portion **51** also moves toward the second wall portion **102** while the contact portion **52** is pressed in the direction intersecting the terminal connection surface **11** and also away from the terminal connection surface **11** (refer to FIG. **6**).

As illustrated in FIG. **5**, the elastic arm portion **53** is connected to an upper edge portion of the through-hole **56** of the main body portion **51** and extends along the second movable member inclined surface **127** from the main body portion **51** toward the fourth wall portion **104**. The elastic arm portion **53** biases the main body portion **51** toward the terminal connection surface **11** when the conductor portion **81** of the electric wire **80** is inserted from the first opening portion **111** into the first region **121** of the accommodating portion **12**. Specifically, when the conductor portion **81** of the electric wire **80** is inserted into the first region **121** of the accommodating portion **12** from the first opening portion **111** and the main body portion **51** moves toward the second wall portion **102**, a distal end of the elastic arm portion **53** is in contact with the first movable member inclined surface **126** and is elastically deformed toward the main body portion **51**. Due to the elastic deformation of the elastic arm portion **53**, the main body portion **51** is biased toward the terminal connection surface **11** (refer to FIG. **6**). That is, the elastic arm portion **53** is configured to convert a pressing force applied to the contact portion **52** by the conductor portion **81** of the electric wire **80** to an elastic force and then to transmit the elastic force to the main body portion **51**.

As illustrated in FIG. **2**, the first pawl portion **54** and the second pawl portion **55** are disposed at the main body portion **51** and in the vicinity of the terminal connection surface **11** and the state display portion **40** and rotate the state display portion **40** so that display of the state display portion **40** can be changed between the connected state and the non-connected state according to the reciprocating movement of the main body portion **51**. Specifically, the first pawl portion **54** and the second pawl portion **55** extend in an arrangement direction arranged from the first opening por-

tion of the terminal connection surface **11** to the third opening portion (that is, in a left and right direction in FIG. **2**) and are disposed to individually come into contact with the protruding portion **42** of the state display portion **40** with an interval therebetween by the reciprocating movement of the main body portion **51**.

The first pawl portion **54** is disposed adjacent to the terminal connection surface **11** in a direction in which the main body portion **51** reciprocates, that is, in a lengthwise direction of the main body portion **51**, and protrudes from the plate surface of the main body portion **51** facing the fourth wall portion **104** toward the fourth wall portion **104**. Further, the second pawl portion **55** is disposed further away from the terminal connection surface **11** than the first pawl portion **54** of the main body portion **51** in the lengthwise direction of the main body portion **51** and protrudes from the plate surface of the main body portion **51** facing the fourth wall portion **104** toward the fourth wall portion **104**, similarly to the first pawl portion **54**.

Also, the protruding portion **42** of the state display portion **40** is disposed between the first pawl portion **54** and the second pawl portion **55** so that one of the first pawl portion **54** and the second pawl portion **55** can be in contact with the protruding portion **42**. That is, by the movement of the main body portion **51** in a direction away from the terminal connection surface **11** (that is, the downward direction in FIG. **2**), the first pawl portion **54** comes into contact with the protruding portion **42** in the cut-out portion **45** of the state display portion **40** and rotates the state display portion **40** to display the connection state (refer to FIG. **6**), and by the movement of the main body portion **51** in a direction approaching the terminal connection surface **11** (that is, an upward direction in FIG. **2**), the first pawl portion **54** moves away from the protruding portion **42** in the cut-out portion **45** of the state display portion **40** and the second pawl portion **55** comes into contact with the protruding portion **42** and rotates the state display portion **40** to display the non-connection state (refer to FIG. **2**).

Next, an operation of the terminal block **1** when the conductor portion **81** of the electric wire **80** is inserted into the first opening portion **111** and the jig **90** is inserted into the second opening portion **112** will be described with reference to FIGS. **2**, **6** and **7**.

When the conductor portion **81** of the electric wire **80** is inserted from the first opening portion **111** of the terminal block **1** into the electric wire insertion region **100** of the first region **121** of the accommodating portion **12**, the conductor portion **81** of the inserted electric wire **80** is in contact with the elastic portion **32** of the leaf spring **30** and presses the elastic portion **32** of the leaf spring **30** in the direction away from the terminal connection surface **11**. Therefore, the elastic portion **32** of the leaf spring **30** is elastically deformed against a spring force thereof, and the conductor portion **81** of the electric wire **80** is clamped between the elastic portion **32** of the leaf spring **30** and the second vertical plate portion **23** of the terminal electrode portion **20** as illustrated in FIG. **6**, and the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the connected state.

Further, when the conductor portion **81** of the electric wire **80** is inserted into the electric wire insertion region **100** of the first region **121** of the accommodating portion **12**, the conductor portion **81** of the inserted electric wire **80** comes into contact with the contact surface **521** of the contact portion **52** of the movable display member **50** and presses the contact surface **521** of the contact portion **52** of the movable display member **50** until the contact portion **52** is in contact with the second wall portion **102** in the direction intersecting the terminal connection surface **11** and also away from the terminal connection surface **11**, as illustrated in FIG. **6**.

At this time, the main body portion **51** of the movable display member **50** is moved by the pressing of the conductor portion **81** of the inserted electric wire **80** toward the contact portion **52** in the direction intersecting the terminal connection surface **11** and also away from the terminal connection surface **11**, and the first pawl portion **54** comes into contact with the protruding portion **42** of the state display portion **40** and rotates the state display portion **40** from a position illustrated in FIG. **2** (that is, a position in which the protruding portion **42** extends substantially in parallel with the terminal connection surface **11**) to a position illustrated in FIG. **6** (that is, a position in which the protruding portion **42** extends in the direction substantially orthogonal to the terminal connection surface **11**) in a counterclockwise direction in the plan view illustrated in FIG. **2**. Accordingly, at least a part of the connection display region **43** is exposed from the third opening portion **113**, and the connected state in which the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are connected is displayed at the third opening portion **113**.

Subsequently, when the jig **90** is inserted from the second opening portion **112** of the terminal block **1** in which the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the connected state as illustrated in FIG. **6**, a distal end of the jig **90** comes into contact with the elastic portion **32** of the leaf spring **30** to further elastically deform the elastic portion **32** of the leaf spring **30** against the spring force thereof as illustrated in FIG. **7**. Accordingly, the contact between the elastic portion **32** of the leaf spring **30** and the conductor portion **81** of the electric wire **80** is released, and the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the non-connected state. After that, the conductor portion **81** of the electric wire **80** in the accommodating portion **12** can be drawn out of the accommodating portion **12**.

When the jig **90** in the accommodating portion **12** is drawn out from the accommodating portion **12** after the conductor portion **81** of the electric wire **80** in the accommodating portion **12** is pulled out to an outside of the accommodating portion **12**, the elastic portion **32** of the leaf spring **30** which is elastically deformed by the jig **90** moves toward the second vertical plate portion **23** of the terminal electrode portion **20** due to the spring force and returns to the state illustrated in FIG. **2** in which the distal end thereof comes into contact with the protruding portion **26** of the second vertical plate portion **23** of the terminal electrode portion **20**.

At this time, the pressing of the conductor portion **81** of the electric wire **80** and the jig **90** toward the contact portion **52** is released, and the elastic arm portion **53** which is elastically deformed while in contact with the first movable member inclined surface **126** biases the main body portion **51** toward the terminal connection surface **11**. Therefore, the main body portion **51** moves in the direction intersecting the terminal connection surface **11** and approaching the terminal connection surface **11**, and the second pawl portion **55** comes into contact with the protruding portion **42** of the state display portion **40** and rotates the state display portion **40** from the position illustrated in FIG. **6** to the position illustrated in FIG. **2** in a clockwise direction in the plan view illustrated in FIG. **2**. As a result, the non-connection display region **44** is exposed from the third opening portion **113**, and the fact that the conductor portion **81** of the electric wire **80**

and the terminal electrode portion **20** are in the non-connected state is displayed at the third opening portion **113**.

The terminal block **1** of the first embodiment includes the state display portion **40** which displays whether the conductor portion **81** and the terminal electrode portion **20** are in the connected state or the non-connected state at the third opening portion **113**. Therefore, for example, even in a small-sized terminal block **1**, the rotation region of the state display portion **40** can be secured in the accommodating portion **12**, and the user can be notified of an accurate connection state of the electric wire **80**.

Further, by the movement of the main body portion **51** in the direction intersecting the terminal connection surface **11** and away from the terminal connection surface **11**, the first pawl portion **54** comes into contact with the protruding portion **42** in the cut-out portion **45** of the state display portion **40** and rotates the state display portion **40** to display the connection state, and by the movement of the main body portion **51** in the direction intersecting the terminal connection surface **11** and approaching the terminal connection surface **11**, the second pawl portion **55** comes into contact with the protruding portion **42** in the cut-out portion **45** of the state display portion **40** and rotates the state display portion **40** to display the non-connection state. Accordingly, for example, even in the small-sized terminal block **1**, the rotation region of the state display portion **40** can be sufficiently secured in the accommodating portion **12**, and the user can be notified of a more accurate connection state of the electric wire **80**.

Furthermore, in the connected state, the connection display region **43** of the state display portion **40** is disposed to be exposed from at least a part of the third opening portion **113**. That is, when the connection display region **43** is exposed from at least a part of the third opening portion **113**, the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are disposed to be in the connected state. Accordingly, even in a smaller terminal block **1**, the user can be notified of the accurate connection state of the electric wire **80**.

Further, a part of the cylindrical body **41** of the state display portion **40** protrudes to the outside of the housing **10** from the third opening portion **113**. Therefore, the connection display region **43** is easy to visually recognize, and the user can be notified more accurately of the connection state of the electric wire **80**.

Further, the terminal electrode portion, the state display portion and the movable display member are not limited to the terminal electrode portion **20**, the state display portion **40** and the movable display member **50** of the first embodiment. For example, a terminal electrode portion **120**, a state display portion **140** and a movable display member **150** illustrated in FIGS. **9** to **11** may be adopted.

In the terminal electrode portion **120** illustrated in FIG. **9**, a cut-out rectangular through-hole **124** which extends over the transverse plate portion **21** and a part of each of the vertical plate portions **22** and **23** and of which one side in a width direction is connected to an outside are provided. The state display portion **140** illustrated in FIG. **10** is provided in a part of the cylindrical body **41** in the direction of the rotation axis **401** and has the cut-out portion **45** in which the ratio of the cut-out portion **45** to the area of the cylindrical body **41** in a plan view in the direction of the rotation axis **401** is larger than ½. In the state display portion **140** of the embodiment, only the connection display region **43** is provided on the outer circumferential surface of the cylindrical body **41** other than the cut-out portion **45**. In addition, the movable display member **150** illustrated in FIG. **11** has a long rod-shaped main body portion **151**.

As illustrated in FIG. **8**, in the terminal block **1** including the terminal electrode portion **120**, the state display portion **140** and the movable display member **150** illustrated in FIGS. **9** to **11**, by the movement of the main body portion **151** of the movable display member **150** in a direction passing the cut-out portion **45**, intersecting the terminal connection surface **11** and away from the terminal connection surface **11**, the first pawl portion **54** comes into contact with the protruding portion **42** in the cut-out portion **45**, and by the movement of the main body portion **151** of the movable display member **150** in a direction passing the cut-out portion **45**, intersecting the terminal connection surface **11** and approaching the terminal connection surface **11**, the first pawl portion **54** moves away from the protruding portion **42** in the cut-out portion **45**, and the second pawl portion **55** comes into contact with the protruding portion **42**. Therefore, a space can be saved in the accommodating portion **12**.

Further, the elastic arm portion **53** of the movable display member **50** is not limited to the case in which it is formed integrally with the main body portion **51** and may be formed separately from the main body portion **51**.

In addition, the terminal connection surface **11** is not limited to the case in which it is configured with one plane, and each opening portion may be configured with a plurality of planes which are individually or arbitrarily combined and disposed.

Second Embodiment

As illustrated in FIGS. **12** to **16**, a terminal block **1** of a second embodiment of the invention is different from that of the first embodiment in that a movable operation feeling generating member **60** having a second protruding portion **70** and a first protruding portion **63** is provided and the third opening portion **113** of the terminal connection surface **11**, the second region **122** of the accommodating portion **12**, the state display portion **40** and the movable display member **50** are not provided.

Further, in the second embodiment, the same reference numerals are assigned to the same parts as those of the first embodiment, the description thereof will be omitted, and the points different from the first embodiment will be described.

As illustrated in FIG. **13**, in an inner surface (that is, the bottom surface of the accommodating portion **12**) of the second wall portion **102** of the accommodating portion **12** of the housing **10**, a first accommodating concave portion **105** disposed at an end on the fourth wall portion **104** side and a second accommodating concave portion **106** disposed on the third wall portion **103** side of the first accommodating concave portion **105** are provided. In the first accommodating concave portion **105**, one of a pair of surfaces on the fourth wall portion **104** side, which extends in a direction intersecting (for example, substantially orthogonal to) the terminal connection surface **11**, is located at an outside of the inner surface of the fourth wall portion **104** to form a stepped portion **107**.

An accommodating cut-out portion **147** which is open to the leaf spring inclined surface **141** is provided at an end of the leaf spring inclined surface **141** of the inclined wall portion **14** of the accommodating portion **12** on the second wall portion **102** side. Furthermore, in the terminal block **1** of the second embodiment, the fourth wall portion **104** also serves as the wire insertion guide wall portion **13**.

As illustrated in FIG. **13**, the movable operation feeling generating member **60** is disposed at the accommodating portion **12** and near the terminal electrode portion **20**, is supported by the housing **10** to be rotatable around a rotation axis **601** extending in a direction intersecting the direction in which the first opening portion **111** and the second opening portion **112** of the terminal connection surface **11** are arranged (that is, a drawing penetration direction in FIG. **13**), and is configured to be capable of generating an operation feeling by rotating as the conductor portion **81** (illustrated in FIGS. **15** and **16**) of the electric wire **80** is inserted from the first opening portion **111** into the accommodating portion **12**.

Specifically, as illustrated in FIG. **14**, the movable operation feeling generating member **60** includes a first contact portion **61** which is capable of coming into contact with the conductor portion **81** of the electric wire **80** inserted into the accommodating portion **12** from the first opening portion **111**, and a second contact portion **62** which is capable of coming into contact with the jig **90** (illustrated in FIG. **16**) inserted into the accommodating portion **12** from the second opening portion **112** via the elastic portion **32** of the leaf spring **30** and has the second protruding portion **70** generating the operation feeling by coming into contact with the first protruding portion **63**. The first contact portion **61** and the second contact portion **62** are formed separately.

The first contact portion **61** has a first surface **611** which is in contact with the conductor portion **81** of the electric wire **80** and a second surface **612** which faces the first surface. The first protruding portion **63** protruding from the first surface **611** toward the terminal connection surface **11** is provided on the first surface **611** of the first contact portion **61**.

Further, a movement restricting portion **64** disposed in the first accommodating concave portion **105** of the accommodating portion **12** is provided on a second surface **612** of the first contact portion **61**. The movement restricting portion **64** includes an arm portion **641** which extends from the second surface **612** in the direction intersecting (for example, substantially orthogonal to) the terminal connection surface **11** and away from the terminal connection surface **11**, and a protruding portion **642** which protrudes from the arm portion **641** toward the fourth wall portion **104**. Movement of the first contact portion **61** in the direction approaching the terminal connection surface **11** is restricted by the protruding portion **642** and the stepped portion **107**. That is, a movement range of the first contact portion **61** is restricted within the first accommodating concave portion **105** by the movement restricting portion **64**.

The second contact portion **62** includes a rotating portion **65** in which the rotation axis **601** is disposed at a center thereof, a first member **66** which extends from the rotating portion **65** in a direction orthogonal to the rotation axis **601**, and a second member **67** which extends from the rotating portion **65** in a direction orthogonal to the rotation axis **601** and intersecting an extending direction of the first member **66** and is in contact with the second surface **612** of the first contact portion **61**.

The rotating portion **65** is disposed in the second accommodating concave portion **106** of the accommodating portion **12**. Further, the first member **66** is disposed to extend toward the terminal connection surface **11**, and the second member **67** is disposed to extend toward the fourth wall portion **104**. In addition, as illustrated in FIG. **13**, the first member **66** is accommodated in the accommodating cut-out portion **147** of the inclined wall portion **14** when the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the non-connected state.

Further, the first member **66** has an arm portion **68** which extends in an extending direction of the second member **67**. In the arm portion **68**, the second protruding portion **70** protruding toward the second member **67** is provided at a distal end thereof which is apart from the first member **66**.

Next, an operation of the terminal block **1** when the conductor portion **81** of the electric wire **80** is inserted into the first opening portion **111** and the jig **90** is inserted into the second opening portion **112** will be described with reference to FIGS. **13** and **15** to **17**.

When the conductor portion **81** of the electric wire **80** is inserted from the first opening portion **111** of the terminal block **1** into the electric wire insertion region **100** of the accommodating portion **12**, the conductor portion **81** of the inserted electric wire **80** is in contact with the elastic portion **32** and presses the elastic portion **32** of the leaf spring **30** in a direction away from the terminal connection surface **11**. Accordingly, the elastic portion **32** of the leaf spring **30** is elastically deformed against the spring force, the conductor portion **81** of the electric wire **80** is clamped between the elastic portion **32** of the leaf spring **30** and the second vertical plate portion **23** of the terminal electrode portion **20**, as illustrated in FIG. **15**, and the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the connected state.

Further, when the conductor portion **81** of the electric wire **80** is inserted into the electric wire insertion region **100** of the accommodating portion **12**, the conductor portion **81** of the inserted electric wire **80** is in contact with the first contact portion **61** of the movable operation feeling generating member **60** and presses the first contact portion **61** of the movable operation feeling generating member **60** in the direction intersecting the terminal connection surface **11** and also away from the terminal connection surface **11** until the second surface **612** of the first contact portion **61** is in contact with the second wall portion **102**, as illustrated in FIG. **15**.

At this time, since the first contact portion is pressed by the conductor portion **81** of the electric wire **80**, the second member **67** of the second contact portion **62** is pressed in the direction intersecting the terminal connection surface **11** and away from the terminal connection surface **11** and rotates the second contact portion **62** from a position illustrated in FIG. **13** (that is, a position in which the first member **66** is accommodated in the accommodating cut-out portion **147** of the inclined wall portion **14**) to a position illustrated in FIG. **15** (that is, a position in which the first member **66** extends in a direction substantially orthogonal to the terminal connection surface **11**) in a clockwise direction in the plan view illustrated in FIG. **13**.

During rotation of the second contact portion **62** after the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are changed from the non-connected state to the connected state, the second protruding portion **70** of the first member **66** of the second contact portion **62** comes in contact with the first protruding portion **63** of the first contact portion **61** to generate the operation feeling. That is, the user is informed that the conductor portion **81** and the terminal electrode portion **20** are changed from the non-connected state to the connected state due to the operation feeling. Further, the operation feeling is formed by a change in an insertion load of the conductor portion **81** of the electric wire **80** into the accommodating portion **12** until the second protruding portion **70** comes into contact with the first protruding portion **63** and passes over the first protrud-

ing portion **63**, and a collision sound generated by collision of the second protruding portion **70** with the first surface **611** of the first contact portion **61** when the second protruding portion **70** passes over the first protruding portion **63**.

Subsequently, when the jig **90** is inserted from the second opening portion **112** of the terminal block **1** in which the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** illustrated in FIG. **15** are in the connected state, the distal end of the jig **90** comes in contact with the elastic portion **32** of the leaf spring **30** and further elastically deforms the elastic portion **32** of the leaf spring **30** against the spring force thereof, as illustrated in FIG. **16**. Accordingly, the contact between the elastic portion **32** of the leaf spring **30** and the conductor portion **81** of the electric wire **80** is released, and the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the non-connected state. After that, the conductor portion **81** of the electric wire **80** in the accommodating portion **12** can be drawn out of the accommodating portion **12**.

At this time, the first member **66** of the second contact portion **62** is pressed by the jig **90** toward the leaf spring inclined surface **141** of the inclined wall portion **14** via the leaf spring **30** and rotates the second contact portion **62** from the position illustrated in FIG. **15** to the position illustrated in FIG. **13** in the counterclockwise direction in the plan view illustrated in FIG. **13**. Accordingly, the first member **66** of the second contact portion **62** is accommodated in the accommodating cut-out portion **147** of the inclined wall portion **14**, and the movable operation feeling generating member **60** returns to the state illustrated in FIG. **13**.

Further, FIG. **17** illustrates the change in the insertion load when the conductor portion **81** of the electric wire **80** is inserted into the accommodating portion **12** to the position illustrated in FIG. **15**. A vertical axis of FIG. **17** illustrates a load applied to the distal end of the conductor portion **81** of the electric wire **80**, and a horizontal axis of FIG. **17** illustrates a position of the distal end of the conductor portion **81** of the electric wire **80** when the terminal connection surface **11** is set to a reference (=a displacement amount is zero).

As illustrated in FIG. **17**, the load applied to the distal end of the conductor portion **81** of the electric wire **80** is increased as the conductor portion **81** of the electric wire **80** is inserted into the accommodating portion **12** from the first opening portion **111**, and reaches a first peak when the distal end of the conductor portion **81** comes into contact with the distal end of the elastic portion **32** of the leaf spring **30** and the conductor portion **81** and the terminal electrode portion **20** are brought into the connected state (that is, at a position of a displacement amount A).

Further, when the conductor portion **81** is inserted into the accommodating portion **12**, the load applied to the distal end of the conductor portion **81** is reduced at once when the distal end of the conductor portion **81** passes over the distal end of the elastic portion **32** of the leaf spring **30**, and the state remains for a while as it is.

Additionally, the second contact portion **62** is rotated by the insertion of the conductor portion **81** into the accommodating portion **12**, and immediately before the second protruding portion **70** of the first member **66** of the second contact portion **62** comes into contact with the first protruding portion **63** of the first contact portion **61** and passes over the first protruding portion **63** (that is, a position of a displacement amount B), the load applied to the distal end of the conductor portion **81** reaches a second peak.

After that, when the conductor portion **81** is further inserted into the accommodating portion **12** and the second protruding portion **70** passes over the first protruding portion **63**, the load applied to the distal end of the conductor portion **81** is reduced at once, and the first contact portion **61** comes into contact with the second wall portion **102** (=a position of a displacement amount C), and the insertion of the conductor portion **81** into the accommodating portion **12** is completed.

According to the terminal block **1** of the second embodiment, the movable operation feeling generating member **60** which is capable of rotating in accordance with the insertion of the conductor portion **81** from the first opening portion **111** into the accommodating portion **12**, and the first protruding portion **63** which is disposed to be capable of coming into contact with the movable operation feeling generating member **60** being rotated by the insertion of the conductor portion **81** into the accommodating portion **12** from the first opening portion **111** after the conductor portion **81** and the terminal electrode portion **20** are changed from the non-connected state to the connected state are provided, and the second protruding portion **70** which comes into contact with the first protruding portion **63** and generates the operation feeling is provided on the movable operation feeling generating member **60**. Accordingly, for example, even when the electric wire **80** is connected to the terminal block **1** in a dark work environment, the user can be notified of the accurate connection state of the electric wire **80** due to the operation feeling generated by the contact between the first protruding portion **63** and the second protruding portion **70**.

Further, the first contact portion **61** and the second contact portion **62** are formed separately. Thus, for example, the first contact portion **61** and the second contact portion **62** can be formed of different materials, respectively, and it is possible to easily adjust the collision sound generated by the collision of the second protruding portion **70** with the first surface **611** of the first contact portion **61** when the second protruding portion **70** passes over the first contact portion **61**.

The movable operation feeling generating member **60** is not limited to the case in which the first contact portion **61** and the second contact portion **62** are formed separately. For example, as illustrated in FIGS. **18** to **21**, the first contact portion **61** and the second contact portion **62** can be integrally formed. In this case, as illustrated in FIG. **19**, the first contact portion **61** is formed integrally with the second member **67** of the second contact portion **62**, an arm portion **168** extending in a direction opposite to the first contact portion **61** (or the second member **67**) with respect to the rotating portion **65** (that is, a left direction in FIG. **19**) is formed on the first member **66** of the second contact portion **62**, and the second protruding portion **70** protruding in an extending direction of the second contact portion **62** and in a direction approaching the rotating portion **65** is provided at a distal end of the arm portion **168** distant from the second contact portion **62**. Furthermore, the first protruding portion **63** protruding toward the terminal connection surface **11** is provided on an opening edge of the accommodating cut-out portion **147** of the inclined wall portion **14** of the accommodating portion **12** on the second wall portion **102** side. Also, in the second wall portion **102** of the embodiment, the first accommodating concave portion **105** is not provided, and only the second accommodating concave portion **106** is provided.

As described above, by integrally forming the first contact portion **61** and the second contact portion **62**, the number of parts of the terminal block **1** can be reduced. Accordingly, it is possible to facilitate assembling of the terminal block **1** and to reduce manufacturing cost.

Third Embodiment

As illustrated in FIGS. **22** to **24**, a terminal block **1** of a third embodiment of the invention is different from those of

the first embodiment and the second embodiment in that the movable operation feeling generating member **60** having the second protruding portion **70** of the second embodiment is included while the third opening portion **113** of the terminal connection surface **11**, the second region **122** of the accommodating portion **12**, the state display portion **40** and the movable display member **50** of the first embodiment are included.

Further, in the third embodiment, the same reference numerals are assigned to the same parts as those of the first embodiment and the second embodiment, and the description thereof will be omitted, and the points different from the first embodiment and the second embodiment will be described.

In the terminal block **1** of the third embodiment, the contact portion **52** of the movable display member **50** also serves as the first contact portion **61** of the movable operation feeling generating member **60**. That is, the first protruding portion **63** is provided on the contact surface **521** of the contact portion **52** of the movable display member **50**.

As described above, since the terminal block **1** includes the state display portion **40** and the movable display member **50**, and the movable operation feeling generating member **60** having the second protruding portion **70**, and the first protruding portion **63** of the second embodiment, the user can be notified of the connection state between the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** due to the generation of the operation feeling generated by the contact between the second protruding portion **70** of the movable operation feeling generating member **60** and the first protruding portion **63** in addition to the display of the state display portion **40**. Accordingly, for example, even when the electric wire **80** is connected to the terminal block **1** in a work environment with a large noise and vibration, and even when the electric wire **80** is connected to the terminal block **1** in a dark work environment, the accurate connection state of the electric wire **80** can be notified to the user.

Further, the notification of the connection state by the state display portion **40**, and the notification of the connection state due to the generation of the operation feeling by the contact between the second protruding portion **70** of the movable operation feeling generating member **60** and the first protruding portion **63** can be performed in an arbitrary order, for example, by adjusting a timing at which the first pawl portion **54** of the movable display member **50** and the protruding portion **42** of the state display portion **40** are in contact with each other.

For example, in a bright work environment with the large noise and vibration, the display by the state display portion **40** may be performed first, and the operation feeling due to the contact between the second protruding portion **70** of the movable operation feeling generating member **60** and the first protruding portion **63** may be generated later, and thus the notification with priority to visibility can be performed. Further, in the dark work environment with a small noise and vibration, the operation feeling due to the contact between the second protruding portion **70** of the movable operation feeling generating member **60** and the first protruding portion **63** may be generated first, and the display by the state display portion **40** may be performed later, and thus the notification with priority to the operation feeling can be performed. Furthermore, the display by the state display portion **40** and the generation of the operation feeling due to the contact between the second protruding portion **70** of the movable operation feeling generating member **60** and the first protruding portion **63** may be simultaneously performed, and it is possible to make the notifications appealing to multiple senses.

Fourth Embodiment

As illustrated in FIGS. **25** to **33**, a terminal block **1** of a fourth embodiment of the invention is different from that of the first embodiment in that the state display portion **40** is provided at a position adjacent to the second opening portion **112** through which the jig **90** can be inserted and pulled out.

Also, in the fourth embodiment, the same reference numerals are assigned to the same parts as those of the first embodiment, and the description thereof will be omitted, and the points different from the first embodiment will be described.

As illustrated in FIGS. **26** and **27**, in the terminal block **1** of the fourth embodiment, the transverse plate portion **21** of the terminal electrode portion **20** is orthogonal to the terminal connection surface **11** and extends in a direction orthogonal to the thickness direction of the housing **10**. Therefore, in the terminal block **1** of the fourth embodiment, in the gap **145** provided between the second gap forming surface **143** and the second wall portion **102**, not the terminal electrode portion **20** but a connecting portion **58** of the movable display member **50** is disposed.

Further, in the terminal connection surface **11**, each of the first opening potion **111** and the third opening portion **113** is adjacent to the second opening portion **112**, the first opening portion **111** is disposed in the terminal connection surface **11** on the third wall portion **103** side, and the third opening portion **113** is disposed in the terminal connection surface **11** on the fourth wall portion **104** side. That is, in the terminal block **1** of the fourth embodiment, the third wall portion **103** also serves as the electric wire insertion guide wall portion **13**.

In addition, a partition wall portion **15** which partitions the first region **121** and the second region **122** is provided in the accommodating portion **12**, and, the first passage portion **123** which is connected to the first region **121** and the second region **122** is provided between the partition wall portion **15** and the second wall portion **102**.

Further, the first vertical plate portion **22** of the terminal electrode portion **20** and the fixed portion **31** of the leaf spring **30** are disposed between the partition wall portion **15** and the first gap forming surface **142** of the inclined wall portion **14**. A cut-out portion **153** which is capable of accommodating the first vertical plate portion **22** of the terminal electrode portion **20** is provided in the partition wall portion **15**. A protruding portion **152** which positions the first vertical plate portion **22** is provided in the cut-out portion **153**. The protruding portion **152** is provided to be insertable into a groove portion **221** (illustrated in FIG. **28**) extending from a distal end surface of the first vertical plate portion **22** in a direction orthogonal to the transverse plate portion **21**.

As illustrated in FIG. **29**, a rotating shaft portion **46** which protrudes in a direction of the rotation axis from one end surface of the cylindrical body **41** in the direction of the rotation axis is provided at the state display portion **40**. The rotating shaft portion **46** has a tapered distal end portion **461** and an annular concave portion **462** provided in a middle in an extending direction of the rotating shaft portion **46** and is inserted into a through-hole **16** which is provided in the third opening portion **113** of the housing **10** to pass through the housing **10** in the plate thickness direction thereof, as illustrated in FIG. **25**. Also, an engaging protrusion (not

illustrated) which is engageable with the annular concave portion **462** is provided on an inner circumferential surface of the through-hole **16** to rotatably support the rotating shaft portion **46**.

As illustrated in FIG. **30**, the movable display member **50** includes a substantially rectangular plate-like main body portion **51** which extends in a direction intersecting the terminal connection surface **11**, a first pawl portion **54** and a second pawl portion **55** which are provided on an end (that is, an upper end in FIG. **30**) of the main body portion **51** closer to the terminal connection surface **11**, a connecting portion **58** which is provided at an end (that is, a lower end in FIG. **30**) of the main body portion **51** distant from the terminal connection surface **11** in an extending direction thereof, and a contact portion **52** which is provided at an end of the connecting portion **58** distant from the main body portion **51** in an extending direction thereof.

The contact portion **52** extends in a direction intersecting the extending direction of the main body portion **51** and away from the main body portion **51** as it approaches the terminal connection surface **11**. Also, a rotation fulcrum portion **57** is provided on a surface of the end of the contact portion **52** which is closer to the main body portion **51** in the extending direction thereof and faces the second wall portion **102** of the housing **10**. The rotation fulcrum portion **57** is provided to be in contact with the second wall portion **102** of the housing **10** and to serve as a rotation fulcrum of the movable display member **50** when the conductor portion **81** of the electric wire **80** inserted into the accommodating portion **12** from the first opening portion **111** comes into contact with the contact surface **521** and the contact portion **52** is pressed toward a bottom surface of the accommodating portion **12**.

Further, the movable display member **50** is configured so that a distance from the rotation fulcrum portion **57** to the end of the main body portion **51** closer to the terminal connection surface **11** is longer than a distance from the rotation fulcrum portion **57** to the end of the contact portion **52** distant from the main body portion **51**.

Here, an operation of the state display portion **40** and the movable display member **50** when the conductor portion **81** of the electric wire **80** is inserted into the electric wire insertion region **100** of the second region **122** of the accommodating portion **12** will be described with reference to FIGS. **27** and **31** to **33**.

When the conductor portion **81** of the electric wire **80** is inserted from the first opening portion **111** of the terminal block **1** illustrated in FIG. **27** into the electric wire insertion region **100** of the second region **122** of the accommodating portion **12**, the conductor portion **81** of the inserted electric wire **80** comes into contact with the contact surface **521** of the contact portion **52** of the movable display member **50**, as illustrated in FIG. **31**. Additionally, the contact surface **521** of the contact portion **52** of the movable member **50** is pressed by the conductor portion **81** of the electric wire **80** in the direction intersecting the terminal connection surface **11** and away from the terminal connection surface **11** until the contact portion **52** is in contact with the second wall portion **102**.

By the pressing of the conductor portion **81** of the electric wire **80** toward the contact portion **52**, the main body portion **51** rotates around the rotation fulcrum portion **57** in a counterclockwise direction in the plan view illustrated in FIG. **31** and moves in the direction intersecting the terminal connection surface **11** and approaching the terminal connection surface **11**. That is, the contact portion **52** transmits a pressing force applied by the conductor portion **81** of the electric wire **80** to the main body portion **51** and also serves as a force transmitting portion for moving the main body portion **51** in the direction intersecting the terminal connection surface **11** and approaching the terminal connection surface **11**.

At this time, the main body portion **51** moves in the direction intersecting the terminal connection surface **11** and approaching the terminal connection surface **11** so that the first pawl portion **54** comes into contact with the cut-out portion **45** of the state display portion **40**. Therefore, the main body portion **51** rotates the state display portion **40** in the counterclockwise direction in the plan view illustrated in FIG. **31** from a position (that is, a position at which the protruding portion **42** extends in a direction substantially orthogonal to the terminal connection surface **11**) illustrated in FIG. **32** to a position (that is, a position in which the protruding portion **42** extends in a direction substantially in parallel with the terminal connection surface **11** and is disposed between the first pawl portion **54** and the second pawl portion **55**) illustrated in FIG. **33**. As a result, at least a part of the connection display region **43** is exposed from the third opening portion **113** and it is displayed at the third opening portion **113** that the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the connected state.

Further, when the jig is inserted into the second opening portion **112** and the conductor portion **81** of the electric wire **80** in the accommodating portion **12** is drawn out of the accommodating portion **12**, the pressing of the conductor portion **81** of the electric wire **80** toward the contact portion **52** is released, the main body portion **51** is biased by a weight of the main body portion **51** and the connecting portion **58** in the direction intersecting the terminal connection surface **11** and away from the terminal connection surface **11** and is rotated about the rotation fulcrum portion **57** in the counterclockwise direction in the plan view illustrated in FIG. **31**, and the movable display member **50** returns to the state illustrated in FIG. **27**.

At this time, the main body portion **51** moves in the direction intersecting the terminal connection surface **11** and away from the terminal connection surface **11**, and the first pawl portion **54** comes into contact with the protruding portion **42** of the state display portion **40**. Accordingly, the main body portion **51** rotates the state display portion **40** from the position illustrated in FIG. **33** to the position illustrated in FIG. **32** in the clockwise direction in the plan view illustrated in FIG. **31**. As a result, the non-connection display region **44** is exposed from the third opening portion **113**, and the fact that the conductor portion **81** of the electric wire **80** and the terminal electrode portion **20** are in the non-connected state is displayed at the third opening portion **113**.

Further, an inclined surface **511** which is inclined in a direction away from the main body portion **51** as it is away from the terminal connection surface **11** is provided at an end of the main body **51** on a side to which the connecting portion **58** is connected. Accordingly, when the contact portion **52** is pressed toward the bottom surface of the accommodating portion **12** by the conductor portion **81** of the electric wire **80**, the movement of the main body portion **51** in a direction approaching the terminal connection surface **11** becomes smooth.

Further, among the partition wall portion **15**, the second wall portion **102** and the fourth wall portion **104**, there is provided a space in which, when the main body portion **51** rotates about the rotation fulcrum portion **57**, the main body portion **51** moves in a direction intersecting the terminal

connection surface **11** and approaching or away from the terminal connection surface **11** and rotates the state display portion **40**.

In the terminal block **1** of the fourth embodiment, the third opening portion **113** of the housing **10** is arranged adjacent to the second opening portion **112**. Therefore, a distance can be provided between the first opening portion **111** into which the electric wire **80** is inserted and the third opening portion **113** in which the state display portion **40** is provided, and thus for example, when the conductor portion **81** of the electric wire **80** is inserted into the first opening portion **111**, it is difficult for the state display portion **40** to be hidden by a user's hand or the like, and the state display portion **40** can be easily confirmed. As a result, the user can be notified of the accurate connection state of the electric wire.

Further, the contact portion **52** of the movable display member **50** extends to intersect the extending direction of the main body portion **51** and to be away from the main body portion **51** as it approaches the terminal connection surface **11**, and the rotation fulcrum portion **57** which is in contact with the housing **10** and serves as the rotation fulcrum of the movable display member **50** is provided at an end of the contact portion **52** on the main body portion **51** side in the extending direction, and the contact portion **52** also serves as the force transmitting portion. Therefore, it is possible to easily confirm the state display portion **40** with a simple configuration when the conductor portion **81** of the electric wire **80** is inserted into the first opening portion **111**, and thus the user can be notified of the accurate connection state of the electric wire.

Various embodiments of the invention have been described in detail with reference to the drawings, but finally, various aspects of the invention will be described.

The terminal block of a first aspect of the invention includes an insulating housing having a terminal connection surface in which a first opening portion through which a conductor portion of an electric wire can be inserted and pulled out, a second opening portion which is adjacent to the first opening portion and through which a jig can be inserted and pulled out and a third opening portion are linearly arranged, and an accommodating portion which is disposed therein and connected to the first opening portion, the second opening portion and the third opening portion, a terminal electrode portion disposed in the accommodating portion and with which the conductor portion inserted into the accommodating portion from the first opening portion is allowed to come into contact, a leaf spring having a fixed portion formed at one end thereof to be fixed to the housing and an elastic portion formed at the other end thereof to be elastically deformable with respect to the fixed portion and disposed in the accommodating portion so that the elastic portion clamps the conductor portion inserted into the accommodating portion from the first opening portion with the terminal electrode portion to allow the conductor portion and the terminal electrode portion to be in a connected state, and the elastic portion comes into contact with the jig inserted into the accommodating portion from the second opening portion to release contact between the elastic portion and the conductor portion to allow the conductor portion and the terminal electrode portion to be in a non-connected state, a state display portion supported by the housing to be rotatable around a rotation axis disposed adjacent to the terminal connection surface of the accommodating portion and extending in direction intersecting an arrangement direction from the first opening portion of the terminal connection surface to the third opening portion thereof and configured to display whether the conductor portion and the terminal electrode portion are in the connected state or the non-connected state at the third opening portion, and a movable display member disposed in the accommodating portion and including a main body portion which extends in a direction intersecting the terminal connection surface and is capable of reciprocating in the direction intersecting the terminal connection surface, a contact portion which is disposed adjacent to the terminal electrode portion and capable of coming into contact with the conductor portion inserted from the first opening portion into the accommodating portion, a force transmitting portion which is connected to the main body portion and moves the main body portion toward the terminal connection surface when the conductor portion is inserted from the first opening portion into the accommodating portion, and a rotating mechanism portion disposed to the main body portion and adjacent to the terminal connection surface and the state display portion and configured to rotate the state display portion so that display of the state display portion can be changed between the connection state and the non-connection state according to the reciprocating movement of the main body portion.

According to the terminal block of the first aspect, the state display portion which displays whether the conductor portion and the terminal electrode portion are in the connected state or the non-connected state at the third opening portion is provided. Accordingly, for example, even in a small-sized terminal block, it is possible to secure a rotation region of the state display portion in the accommodating portion and to inform the user of the accurate connection state of the electric wire.

In the terminal block of a second aspect of the invention, the state display portion includes a cylindrical body having a cut-out portion provided at a part of an outer circumference thereof and extending along a center axis thereof and in which the center axis is the rotation axis, and a protruding portion provided at a middle portion of the cut-out portion of the outer circumference and protruding in a direction intersecting the rotation axis, and the rotating mechanism portion of the movable display member has a first pawl portion and a second pawl portion which respectively extend in the arrangement direction from the first opening portion of the terminal connection surface to the third opening portion thereof and are disposed to be spaced apart from each other and to be individually brought into contact with the protruding portion by the reciprocating movement of the main body portion, and the first pawl portion is disposed closer to the terminal connection surface than the second pawl portion in a reciprocating direction of the main body portion, and the protruding portion is provided between the first pawl portion and the second pawl portion, and one of the first pawl portion and the second pawl portion is capable of coming into contact with the protruding portion, and by movement of the main body portion in a direction away from the terminal connection surface, the first pawl portion comes into contact with the protruding portion in the cut-out portion to cause the state display portion to rotate and to display the connected state, and by the movement of the main body portion in a direction approaching the terminal connection surface, the first pawl portion is away from the protruding portion in the cut-out portion and the second pawl portion comes into contact with the protruding portion to cause the state display portion to rotate and to display the non-connected state.

According to the terminal block of the second aspect, for example, even in a small-sized terminal block, it is possible to sufficiently secure a rotating region of the state display

portion in the accommodating portion and to notify a user of more accurate connection state of the electric wire.

The terminal block of a third aspect of the invention is disposed so that the first pawl portion comes into contact with the protruding portion in the cut-out portion by the movement of the main body portion of the movable display member in a direction away from the terminal connection surface through the cut-out portion, and the first pawl portion is away from the protruding portion in the cut-out portion by the movement of the main body portion in a direction approaching the terminal connection surface through the cut-out portion while the second pawl portion comes into contact with the protruding portion.

According to the terminal block of the third aspect, since the main body portion of the movable display member reciprocates through the cut-out portion of the state display portion, a space of the accommodating portion can be saved. Therefore, for example, even in the small-sized terminal block, it is possible to sufficiently secure the rotating region of the state display portion in the accommodating portion and to notify the user of the more accurate connection state of the electric wire.

In the terminal block of a fourth aspect of the invention, the state display portion has a connection display region which displays the connected state on the outer circumference of the cylindrical body other than the cut-out portion, and the connection display region is disposed to be exposed from at least a part of the third opening portion in the connected state.

According to the terminal block of the fourth aspect, even in a smaller terminal block, it is possible to notify the user of the more accurate connection state of the electric wire.

In the terminal block of a fifth aspect of the invention, a part of the outer circumference of the cylindrical body of the state display portion protrudes from the third opening portion to an outside of the housing.

According to the terminal block of the fifth aspect, the connection display region is easy to visually recognize, and the user can be notified of the more accurate connection state of the electric wire.

The terminal block of a sixth aspect of the invention includes a movable operation feeling generating member which is supported by the housing to be rotatable around the rotation axis disposed adjacent to the terminal electrode portion of the accommodating portion and extending in a direction intersecting the arrangement direction from the first opening portion of the terminal connection surface to the third opening portion thereof and rotates according to insertion of the conductor portion into the accommodating portion from the first opening portion to generate an operation feeling, and a first protruding portion which is disposed in the accommodating portion to be capable of coming into contact with the movable operation feeling generating member being rotated by the insertion of the conductor portion into the accommodating portion from the first opening portion after the conductor portion and the terminal electrode portion are changed from the non-connected state to the connected state, and the movable operation feeling generating member includes a first contact portion which is capable of coining into contact with the conductor portion inserted into the accommodating portion from the first opening portion, and a second contact portion which is rotatable in contact with the jig inserted into the accommodating portion from the second opening potion via the elastic portion and has a second protruding portion generating the operation feeling by coming into contact with the first protruding portion.

According to the terminal block of the sixth aspect, for example, even when the electric wire is connected to the terminal block in a work environment with large noise and vibration, and even when the electric wire is connected to the terminal block in a dark working environment, the user can be notified of the accurate connection state of the electric wire.

In the terminal block of a seventh embodiment of the invention, the third opening portion of the housing is disposed adjacent to the second opening portion.

According to the terminal block of the seventh aspect, since a distance can be provided between the first opening portion into which the electric wire is inserted and the third opening portion in which the state display portion is provided, for example, when the conductor portion of the electric wire is inserted into the first opening portion, it is difficult for the state display portion to be hidden by a user's hand or the like, and the state display portion can be easily confirmed. As a result, the user can be notified of the accurate connection state of the electric wire.

In the terminal block of an eighth aspect of the invention, the contact portion of the movable display member intersects the extending direction of the main body portion and extends away from the main body portion as it approaches the terminal connection surface, and a rotation fulcrum portion which is in contact with the housing and serves as a rotation fulcrum of the movable display member is provided at an end of the contact portion on the main body portion side in the extending direction, and the contact portion also serves as the force transmitting portion.

According to the terminal block of the eighth aspect, it is possible to easily confirm the state display portion when the conductor portion of the electric wire is inserted into the first opening portion with a simple configuration and to notify the user of the accurate connection state of the electric wire.

Further, any of the various embodiments or modified examples described above may be appropriately combined to achieve the respective effects. Also, a combination of the embodiments or a combination of the embodiments or a combination of the embodiment and the embodiment is possible and a combination of features in different embodiments or examples is also possible.

The invention can be applied to, for example, a DIN rail mounting type terminal block.

What is claimed is:

1. A terminal block comprising:

an insulating housing having a terminal connection surface in which a first opening portion through which a conductor portion of an electric wire can be inserted and pulled out, a second opening portion which is adjacent to the first opening portion and through which a jig can be inserted and pulled out and a third opening portion are linearly arranged, and an accommodating portion which is disposed therein and connected to the first opening portion, the second opening portion and the third opening portion,

a terminal electrode portion disposed in the accommodating portion and with which the conductor portion inserted into the accommodating portion from the first opening portion is able to come into contact,

a leaf spring having a fixed portion formed at one end thereof to be fixed to the housing and an elastic portion formed at the other end thereof to be elastically deformable with respect to the fixed portion and disposed in the accommodating portion so that the elastic portion clamps the conductor portion inserted into the accommodating portion from the first opening portion with

the terminal electrode portion to allow the conductor portion and the terminal electrode portion to be in a connected state, and the elastic portion comes into contact with the jig inserted into the accommodating portion from the second opening portion to release contact between the elastic portion and the conductor portion to allow the conductor portion and the terminal electrode portion to be in a non-connected state,

a state display portion supported by the housing to be rotatable around a rotation axis disposed adjacent to the terminal connection surface of the accommodating portion and extending in a direction intersecting an arrangement direction from the first opening portion of the terminal connection surface to the third opening portion thereof and configured to display whether the conductor portion and the terminal electrode portion are in the connected state or the non-connected state at the third opening portion, and

a movable display member disposed in the accommodating portion and including a main body portion which extends in a direction intersecting the terminal connection surface and is capable of reciprocating in the direction intersecting the terminal connection surface, a contact portion which is disposed to the main body portion and adjacent to the terminal electrode portion and capable of coming into contact with the conductor portion inserted from the first opening portion into the accommodating portion, a force transmitting portion which is connected to the main body portion and moves the main body portion toward the terminal connection surface when the conductor portion is inserted from the first opening portion into the accommodating portion, and a rotating mechanism portion disposed to the main body portion and adjacent to the terminal connection surface and the state display portion and configured to rotate the state display portion so that display of the state display portion can be changed between the connection state and the non-connection state according to the reciprocating movement of the main body portion.

2. The terminal block according to claim **1**, wherein the state display portion includes a cylindrical body having a cut-out portion provided at a part of an outer circumference thereof and extending along a center axis thereof and in which the center axis is the rotation axis, and a protruding portion provided at a middle portion of the cut-out portion of the outer circumference and protruding in a direction intersecting the rotation axis, and

the rotating mechanism portion of the movable display member has a first pawl portion and a second pawl portion which extend in the arrangement direction from the first opening portion of the terminal connection surface to the third opening portion thereof and are disposed to be spaced apart from each other and to be individually brought into contact with the protruding portion by the reciprocating movement of the main body portion, and

the first pawl portion is disposed closer to the terminal connection surface than the second pawl portion in a reciprocating direction of the main body portion, the protruding portion is provided between the first pawl portion and the second pawl portion, and one of the first pawl portion and the second pawl portion is capable of coming into contact with the protruding portion, and

by movement of the main body portion in a direction away from the terminal connection surface, the first pawl portion comes into contact with the protruding portion in the cut-out portion to cause the state display portion to rotate and to display the connected state, and by the movement of the main body portion in a direction approaching the terminal connection surface, the first pawl portion moves away from the protruding portion in the cut-out portion and the second pawl portion comes into contact with the protruding portion to cause the state display portion to rotate and to display the non-connected state.

3. The terminal block according to claim **2**, wherein the first pawl portion comes into contact with the protruding portion in the cut-out portion by the movement of the main body portion of the movable display member in a direction away from the terminal connection surface through the cut-out portion, and the first pawl portion moves away from the protruding portion in the cut-out portion by the movement of the main body portion in a direction approaching the terminal connection surface through the cut-out portion while the second pawl portion comes into contact with the protruding portion.

4. The terminal block according to claim **2**, wherein the state display portion has a connection display region which displays the connected state on the outer circumference of the cylindrical body other than the cut-out portion, and the connection display region is disposed to be exposed from at least a part of the third opening portion in the connected state.

5. The terminal block according to claim **2**, wherein a part of the outer circumference of the cylindrical body of the state display portion protrudes from the third opening portion to an outside of the housing.

6. The terminal block according to claim **1**, further comprising

a movable operation feeling generating member which is supported by the housing to be rotatable around a rotation axis disposed adjacent to the terminal electrode portion of the accommodating portion and extending in a direction intersecting the arrangement direction from the first opening portion of the terminal connection surface to the third opening portion thereof and rotates according to insertion of the conductor portion into the accommodating portion from the first opening portion to generate an operation feeling, and

a first protruding portion which is disposed in the accommodating portion to be capable of coming into contact with the movable operation feeling generating member being rotated by the insertion of the conductor portion into the accommodating portion from the first opening portion after the conductor portion and the terminal electrode portion are changed from the non-connected state to the connected state, and

wherein the movable operation feeling generating member includes a first contact portion which is capable of coming into contact with the conductor portion inserted into the accommodating portion from the first opening portion, and a second contact portion which is rotatable while in contact with the jig inserted into the accommodating portion from the second opening potion via the elastic portion and has a second protruding portion generating the operation feeling by coming into contact with the first protruding portion.

7. The terminal block according to claim **1**, wherein the third opening portion of the housing is disposed adjacent to the second opening portion.

8. The terminal block according to claim **7**, wherein the contact portion of the movable display member intersects the extending direction of the main body portion and extends

away from the main body portion as it approaches the terminal connection surface, a rotation fulcrum portion which is in contact with the housing and serves as a rotation fulcrum of the movable display member is provided at an end of the contact portion on the main body portion side in the extending direction, and the contact portion also serves as the force transmitting portion.

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